THE ENGINEERING AND MINING JOURNAL.

Vol. XII.—No. 10.—Fourth Series.] NEW YORK, TUESDAY, SEPTEMBER 5, 1871. [Single Copies 10 Cents.

The Mines and Works of the Lehigh Zinc Company.*

[CONCLUSION.]

II. THE WORKS.

The blende as it comes from the mines is crushed in a Blake's crusher and passed over a sieve with one mesh to the inch. The larger pieces, which pass over the sieve, are separated from the gangue by hand, and the ore sent directly to the works, or roasted in heaps 26½ feet long, 14½ feet wide and 8 feet high, holding 50 tons. The ore is placed upon iron grates supported by two lateral walls and one central wall, all of stone. The centre wall is three feet thick, being twice the thickness of those on the sides. Wood placed beneath the grates is used for firing. The small stuff which passes through the sieve, when it comes from the crusher, is, at present, laid aside for future treatment. The crusher, needs about 10 horse-power, and, with one man to feed it, does the work of four men breaking ore by hand. The silicates and carbonates are washed, sized and the larger pieces sent at once to the works. The sands are concentrated by buddling or jigging. The conical washer, in which the ore is washed, is 10 feet 2 inches long, 5 feet 2 inches in diameter at the large end and 3 feet at the smaller end. The ore is fed in at the larger, and worked up to the smaller end by means of teeth 6½ inches wide and high, set slanting. From the washer, the ore passes into a revolving screen attached to it. The meshes of this screen are 3¼ inch. The pieces which are too large to pass through this screen are sorted by hand, and the ore sent at once to the works. The siliceous ore deposited by the water is rewashed in the roller before being buddled. Sometimes the earthy ore occurs hard enough, and sufficiently free from sand, to dispense with washing.

The buddles used are of the regular Cornish pattern, the pulp being fed at the centre, and the discharge being on the circumference. The sand pile when formed in the buddle is 13 feet 8 inches in diameter, and 2 feet deep on an average, being higher in the centre, and sloping down towards the margin. Each buddle holds about 15 tons. Sweeps, five feet in length, attached to revolving arms, push the pulp along as it runs over the conical pile already formed, serving to keep the surface in good condition, and facilitating the deposition of the particles according to their specific gravities. When a buddle is finished the pile is divided into concentric rings. The innermost of these is regarded as ore, and, after a little more treatment, sent to the works; the next is reworked in the same buddle, and the third portion in another buddle. Keeves are also employed. These are 3 feet in diameter at the top, 2 feet at the bottom and 3 feet deep. After stirring the ore thoroughly with water till the tub is full, it is allowed to settle, the keeve meanwhile being tapped with an iron bar.

A continuous jig is being tried for concentrating the sand. The dressed ore is transported to the smelting works, which are situated in South Bethlehem about four miles distant, by wagons drawn by four mules each, and carrying 3½ tons.

* Abstract of a paper, by Mr. H. S. Drinker, read before the American Institute of Mining Engineers, August 16th, 1871.

METALLURGICAL PROCESSES.

The oxidized ores used for the preparation of zinc-white generally contain about 20 per cent of zinc. Three hundred pounds of ore, mixed with one hundred and fifty pounds of pea or dust coal, are fed together through chilled iron rollers and then on to a screen for the purpose of sizing. Fine and coarse ores are not treated together, though subjected to the same subsequent process, which consists in a volatilization of the oxide of zinc by heat, a cooling of the gases, and the collection of the zinc-white in long bags of ordinary muslin, the gaseous substances passing through the interstices in the cloth.

THE FURNACES

are of two kinds, single and double. The former are charged only at one end, and only hold a little over a third of the charge of the latter, which are provided with a working door at either end. The single furnaces are five feet long and three feet wide, covered with an arch of fire-brick, which at the centre is three feet above the hearth. The opening into the flue is 18 inches square, and the hearth consists of an iron grate made of heavy rolled iron with perforations to allow the air to pass through. The front opening or charging door is 3 feet long and arched so as to be 1 foot high at the centre. These furnaces cost about $150, and are charged with 240 lbs of ore, 120 lbs. of coal and 100 lbs. pea coal as a bed. The double furnaces have an opening 30 inches square into the main flue, and are provided with grates, of similar construction to those used in the small furnaces, 16 feet long by 5 feet wide. The working doors are of the same dimensions as those of the small furnaces. The walls are all of fire-brick, 8 inches thick, and last about 8 years without repairs. The double furnaces are charged with 640 lbs. of ore, 320 of coal, 240 of pea coal as bedding. No fluxes are added, the object being to keep the charge from becoming impervious to the blast, which is furnished by four fan-blowers.

The process lasts four hours for each charge, and considerable attention, on the part of the workmen, is necessary to keep the cinder porous and avoid the cooling of the fire by an excess of blast. Each workman has four furnaces under his care, and cleans and charges one each hour.

The oxide vapor passes from the furnaces along a conducting channel over a sheet of water, into a cooling tower 75 feet high and 80 feet in circumference at the base. Much of the damp, impure oxide settles in this tower, and the remainder is conveyed down another tower 50 feet high, [and by an exhaust fan is forced, through a conducting channel, into the bag-rooms. This conducting channel is floored with sheet zinc, and serves as a cooling chamber, in which another portion of impure oxide collects. The muslin bags in the bag-room are 30 feet long and are attached to the sheet-iron tubes that convey the oxide from the cooling chamber, so that they hang down perpendicularly. They are shaken by the bagmen every four hours, and the oxide removed every twelve hours. After some preparatory treatment this oxide is packed and shipped.

THE SPELTER WORKS.

Both blende and oxidized ores (silicates and carbonates) are used in this branch of the work. The latter are roasted in large kilns with one ton of coal to ten of ore. The diameter of these kilns, at the largest part, is about 10 feet. The roasting requires 24 hours. The roasted material is crushed with coal, 100 tons of ore to 40 of coal, and when sifted is ready for charging into the retorts.

The blende, after being roasted in heaps at the mines, is first crushed, and then roasted as nearly dead as possible, in reverberatory furnaces, after being mixed with 40 per cent. of coal dust. From one to two per cent. of sulphur is, however, still left in the ore.

The retorts are made at the works of a mixture of fresh fire-clay and ground fragments of old retorts, and are 42 inches long, 9 inches in diameter outside, and 6 inside. The condensers fitting by a level in the retorts, are 16 inches long, 6 inches in diameter at the largest, and 3 at the smallest end (from outside to outside), the shell being a little over ½ inch in thickness. Fifty-six retorts are placed in each furnace, in seven rows, eight retorts being in a row. Beneath the retorts is placed a row of six, so-called cannons to break the heat. These are 3 feet 4 inches long, and 7 inches in diameter, outside, and are not charged. The retorts rest at the back on ledges, and at the front on plates of fire brick 24 inches long, 9½ inches broad and 2 inches thick, supported by vertical fire-brick pillars 11 inches high. The furnaces are built in groups of four, the internal walls being entirely of fire-brick, and the external ones of common brick, lined with fire-brick. The walls of each furnace enclose a space 8 feet 3 inches by 2 feet 6 inches, the internal walls being about 18 inches, and the side walls 2 feet 6 inches thick. The slant at which the retorts are placed varies with the purity of the ore, but is generally from 3 to six inches from end to end. The furnaces have a frame-work of cast iron to add strength, and flat iron plates are placed in front of the retorts to support the condensers, ladles, etc.

Forty pounds of the mixture previously mentioned, is charged every twelve hours into each retort, excepting those in the upper row, which are charged every 24 hours, with skimmings, impurities, etc., containing from 60 to 65 per cent. of zinc. As soon as oxide of zinc is seen burning at the ends of the condensers, prolongs of sheet-iron, tapering to a fine point, are put on to the condensers to save the escaping zinc. Every twelve hours the zinc is collected in ladles, and poured into moulds 7 inches by 24, and 1 inch deep, forming ingots which weigh from 40 to 45 lbs. each.

A block, of four spelter furnaces, costs about $5,000, and one double reverberatory furnace for roasting, about $2,500.

The process which actually takes place in the retort is the following: The air introduced with the charge causes an imperfect combustion of a portion of the carbon present forming carbonic oxide, (CO), which reduces oxide of zinc to a metallic state, by taking oxygen from it, and forms carbonic acid, (CO_2). We have then present in the retort, at a high temperature, oxide of zinc, carbon, and carbonic oxide. By the reduction of two atoms of zinc-oxide

to a metallic state, one atom of carbonic-oxide is converted into carbonic acid, and one atom of carbon into carbonic oxide, and so the process goes on, continually repeating itself till the contents of the retort is exhausted. The following formula may make the action clearer: $2\,Zn.\ O+C+CO=2\,Zn.+CO+CO^2$.

Mr. ANDREW DIETRICH, of these works, says that from carbonate and silicate ores containing 47 per cent. of zinc he can actually extract from 34 to 35 per cent., and that from roasted blende containing 47 per cent. he can extract 33 to 34 per cent. The difference is due to the presence of the small quantity of sulphur previously mentioned.

The spelter works deliver about 65 hundred weight of metal per day to the

ROLLING MILL,

where it is re-melted in a reverberatory furnace, and run out in shallow moulds of various sizes, according to the gauge of sheet-metal on which the mill is running. After passing through the rolls till reduced to the proper thickness, and having been previously annealed and trimmed, the sheets are packed in casks containing 1,200 lbs. each.

The author concluded by expressing his thanks to Mr. WEBSTER, the President of the Company, and to the heads of the various departments for the facilities which they afforded him in obtaining the necessary information and for their kindness in furnishing exact figures, which add greatly to the value of the paper.

[We have been compelled to omit much interesting matter in the preparation of the above abstract of Mr. DEINKER's paper, but we believe that we have not left out any thing necessary to a clear understanding of the subject. For some slight alterations we also would ask the author's indulgence.—EDS.]

The Twentieth Meeting of the American Association for the Advancement of Science.

AMONG the most prominent of the subjects which came up for discussion, and which furnished a prominent topic of private conversation among the members, was the mineral resourses of the State of Indiana in coal and iron. An admirable address was delivered upon this subject by Dr. T. STERREY HUNT on the evening of the 21st ult., at the Academy of Music, in Indianapolis. This lecture contained the speaker's convictions with reference to the adaptability of the block coal of Indiana in connection with Lake Superior ores for the production of Bessemer metal. But a scant report of this lecture has as yet reached us, though we hope to get more accurate notes on the subject ere long. The Association visited Terre Haute in the middle of its session, and were much delighted with the trip, though it consumed considerable time, which many of the members would have preferred to have devoted to the reading of papers.

It was suggested that the papers to be considered, which are now read before the sections A and B, should be sent in a month before the meeting, printed, and put in the hands of every member at the meeting, so that the time now occupied in the reading of the paper could be devoted to the discussion of it by the members, the time allowed for such discussion being fixed beforehand by the committee.

Among the papers read which attracted the most attention we can mention only a few.

Prof. HENRY, of the Smithsonian Institute, delivered a brief address on meteorology, confining himself principally to the work of the Smithsonian Institution and investigations concerning the rain-fall of the United States. He still clung to the belief that a correct knowledge of principles—for which, and not for mere facts, Science looks—would eventually show that rain is not a matter of uncertainty; that rains and drouths would be computed and predicted in different localities. He reviewed much of the work of the Signal Service in respect to the weather reports, and went over much of the ground in those matters with which the readers of the *Tribune* have been recently rendered familiar. He divided the characteristics of the country in respect to the weather into several distinct types; the position of the sun and the topography of the country being the principal factors in such calculations, and the dates of maximum and minimum rainfall serving to distinguish them. The distinction of rain-fall dates was remarkable. In California the rain-fall was greatest in winter; in Florida, in summer. The specific heat of different soils should also be considered. He mentioned the difference in this respect between clay and sand, and estimated that a pound of water gives out six times the heat of a pound of brick.

Prof. J. N. STOCKWELL read a paper entitled "An Inquiry concerning the Physical Relation between the Masses and Mean Distances of the Different Planets." The inquiry originated in an attempt to explain the physical significance of some conditions of maxima that manifest themselves when particular values of some of the planetary masses are employed in the determination of the secular variations of the elements of the orbits. The fundamental condition to be satisfied is that the solar system is so constituted as to insure to itself greater security against the action of foreign forces than any other system of bodies moving at the same distances. Prof. STOCKWELL finds that the mass of the earth which satisfies this condition is 1-327,000th of the sun's mass. This corresponds to a solar parallax of 8."816., a value differing by only one-nineteenth of a second from the mean of the determinations made by other methods. The same condition being applied to the determination of the mass of Venus, gives a volume only a very little larger than the determinations by other methods. Unfortunately, the mass of the planets Saturn, Uranus, and Neptune require very considerable alterations in order to bring them into harmony with Jupiter's mass, which is well known. But whether any admissible changes in their received values will bring the system into harmony with the fundamental hypothesis remains to be determined.

Dr. P. H. VAN DER WEYDE of New York read a paper detailing an original investigation to ascertain the existence of cold lines in the dark portion of the solar spectrum, to correspond with the Frauenhofer lines in the luminous portion. After reviewing the successive discoveries in regard to the heated rays of the solar spectrum, from those of Hershel, in 1800, to the present day, Dr. VAN DER WEYDE pointed out that the color spectrum consists of three kinds of rays, caloric, luminous, and chemical, of which the first and last are invisible; that the dark lines discovered by Frauenhofer in the luminous portion, and on which the modern spectroscope is founded, have also been discovered in the invisible chemical portion as lines without chemical action; and that therefore it is probable *a priori*, that there will be also lines without heat in the caloric portion. To find those lines by means of the application of the thermopile to the spectroscope, a special prism had to be constructed of Brasilian pebble, as glass absorbs too much heat. By means of such an instrument and the thermo-electric pile of Melloni, the Doctor had discovered several lines in the dark, hot space beyond the red; lines which could only be distinguished by a temperature lower than the adjacent parts. These lines he has called A′, B′, C′, etc., and he found that the line D′, lying at the same distance from the Frauenhofer line A, as A is from the sodium line D, is a very broad band, covering considerable space. The difficulties yet to be overcome are the double refraction of the quartz prisms, in which the Doctor hoped to succeed by the polarization of light, and to ascertain the relative temperature of the different portions, and the modifications in the spectrum and lines by the employment of different media. The main points were illustrated by fine colored diagrams, and excited a lively interest among the members, as was evident from the animated discussion following concerning the importance of these discoveries.

In this discussion it was stated by Prof. VAN DER WEYDE that there appeared to be a difficulty in the unlike characteristics of heat, light, and actinic power which made it difficult to compare them. He mentioned that in the interference spectrum the highest point of luminosity was always in the middle of the spectrum. Prof. Tillman insisted that the three divisions, heat, light, and actinism, are merely difference of wave lengths, and objected to diagrams which represented them otherwise. Prof. Eaton made some interesting suggestions concerning the future course of such experiments, proposing to test certain questions raised by substituting a crystal of salt for the prism used. Dr. VAN DER WEYDE affirmed the accuracy of his measurements represented in the diagrams as "three mountains" of different colors.

A very interesting discussion on the Metric System was brought about by an able paper by Prof. J. E. HILGARD, discussing the subject rationally, and showing the disadvantages as well as the advantages of the system. He began by giving facts regarding the standard metric measures and weights, which are now undergoing a strict scrutiny and examination at Washington, and detailing the accuracy achieved with reference to the weights and the manner in which the meter measures were tested and divided. Discussion followed, in which Dr. SMITH and Profs. VAN DER WEYDE and EATON took part. In the evening, the subject was brought up again, and as it is one of considerable practical importance, we reserve the publication of the discussion for a future occasion.

Prof. EDWARD D. COPE, of Philadelphia, read a very able and important paper on the "Method of Creation," in which he set forth his theory of Evolution as opposed to the other theory of Natural Selection, which has been so ably advocated by DARWIN, WALLACE and others. As we could not do justice to the author in the space at our disposal, we refrain, at present, from any explanation or discussion of the views advanced.

Prof. VAN DER WEYDE explained a new test for ascertaining the safety of petroleum for use in lamps. This test is founded on the fact that all vapors given off by petroleum are combustible, and that if any kerosene or other preparation from petroleum gives off a vapor at the accepted standard temperature of 110°, it is not necessary to try whether it will burn, but sufficient to collect it in a proper vessel, by which we gain the additional advantage that we may measure the quantity of the vapor, while none of it can be lost by air currents incidentally passing over the surface of the liquid. He takes, therefore, a glass tube closed at one end, and open at the other, and fills it with the petroleum to be tested, then closing the open end with the finger, inverts it in a vessel with water warmed to 110° by mixing hot and cold water, and keeping it at that temperature by occasionally adding hot water. If now any vapor be apparent, it will collect in the closed upper part of the tube, displacing the oil downward. The amount of this gas will be a comparative test of the different qualities of oil, and for this purpose the tube may be graduated, in order to measure the amount of volatile liquid present in the same. This method is not subject to the discrepancies found in the usual way of testing, in which an impure and dangerous quality of oil may be made to appear better than it is by slow and gradual heating, and which, if performed in a slight draft of air, will have the vapors carried off as soon as developed, so that it becomes impossible to ignite them. This new method gives freedom from the danger of using fire, more accuracy, a trustworthy means of measurement, and no chance for deception.

The question of the fossil character of the *Eözoon Canadense* was again agitated. Mr. E. BICKNELL, of Cambridge, Mass., who has made a large number of preparations of Eözoon, and has seen specimens from many localities, doubted the organic origin of the Massachusetts specimens, by saying that those from Canada have, undoubtedly, been correctly described by Dr. CARPENTER.

The following officers were appointed for the ensuing year:

President—Prof. J. LAWRENCE SMITH, of Louisville, Ky.

Vice President—Prof. ALEX. WINCHELL, of Ann Arbor, Mich.

Permanent Secretary—Prof. JOSEPH LOVERING, of Cambridge, Mass.

General Secretary—Prof. E. S. MORSE, of Salem, Mass.

Treasurer—WILLIAM S. VAUX, of Philadelphia, Pa.

Auditing Committee—Messrs. EUSTIS and WHEATLAND, of Massachusetts.

Numerous resolutions of thanks and expressions of gratification at the manner in which they had been entertained, preceded the adjournment.

Two hundred and fifty members registered themselves for the trip to the Mammoth Cave in Kentucky.

The Native Sulphur Mines of Spain.

AUSTIN, NEVADA, PACIFIC MINING CO.,
August 15th, 1871.

TO THE EDITOR—Sir: Having been absent from this place for some weeks, and my official occupations at Salt Lake City having occupied all my attention, it has been a matter of impossibility for me to comply earlier with the promise I gave of one or two letters on the Sulphur Mines of Spain and Italy.

I use the expression native sulphur, to avoid confusion with the ores from the extensive pyrites mines of the south of Spain, province of Huelva, which are erroneously called sulphur ores. The yearly amount of pyrites that are shipped from Spain to England for the manufacture of sulphuric acid reach the sum of 400,000 tons. It is not many years since pyrites have been used for the manufacture of the acid. Formerly it was manufactured from the second and third quality of sulphur from the Sicilian mines. Pure sulphuric acid is still manufactured from Sicilian sulphur, for it is found that the acid made from pyrites is impure, and can only be used for the manufacture of artificial "guanos." Native sulphur is found all through the southern provinces of Spain, such as Valencia, Alicante, Murcia, and Andalusia, also in Aragon, where the writer possessed several mines, from 1860 to 1865. There was a great demand in those years for sulphur, in the shape of flowers and ground sulphur; about 20,000 tons per annum being used in destroying the fungi called oidium, which committed such ravages on the vineyards as to leave whole provinces without any vintage. In the province of Teruël, Aragon, native sulphur is found in horizontal seams, cropping out on the sulphur on the side of high mountains. The average thickness was from 8 to 10 feet, and the percentage throughout about 13. In Alicante native sulphur is found on the contact of limestone with bituminous shales, which produce a small quantity of oil. Here the strata lie perpendicular. In Lorca, in the province of Murcia, these ores are found in the same manner as above, the sulphur seam being 4 feet wide, but here the strata dip at an angle of forty-five, and the mines are worked by inclined shafts.

In Hellin, province of Albacete, the strata are horizontal, and the sulphur seams are only some forty feet from the surface. The overlying rock has been quarried off the sulphur seams, which here have an average thickness of sixty feet, and produce about fifteen feet aggregate thickness of sulphur ore of 30 per cent.

In Arcos de la Frontera, province of Seville, near the celebrated town of Xerez—vulgarly called by the unmusical Anglo-Saxon, Sherry—I worked some native sulphur deposits; but these were irregular infiltrations, with no decided direction, and the formation was of a *most* recent tertiary deposit of soft clays, formed on the banks of the rivulet called "Rio de Arcos," which is always dry in the summer. This rivulet carries a saline sulphurous water, containing as much as 20 per cent. of chloride of sodium. The sulphur is precipitated on the bed of the rivulet every year, and new strata of sulphur formed. I found the bed in the summer composed of a conglomerate of native sulphur, pebbles, and sand. Here I also established one calcarone.

When the writer purchased the above mines, he found that the processes employed were not only very expensive, and the plant as well, but that the production in consequence was small in comparison to the outlay. The process consisted in distillation in cast-iron retorts, several of these placed in a row, in a species of reverberatory furnace. The fuel used was pinewood. This induced the writer to pay a visit to the Sicilian mines, with the object of studying the processes on that island, which has always competed with the rest of the world in supplying the greatest quantity of sulphur, and at the lowest rates. The native sulphur of the mines in Aragon is found in a pseudo-morphous state, millions upon millions of petrified shells, *Lymnea* and *Planorbis*—these belong to the geological formation called miocene—as well as weeds of all classes, converted into native sulphur. After a mature investigation of the processes in Sicily, the writer established on his own works the Calcarone furnaces, and a patent was granted to him by Queen Isabella for the whole of Spain, and calcarone were established in the provinces of Murcia, Sevilla, and Albacete, the writer directing personally, and with good results, all the operations. On a recent visit to Spain by the writer, in the summer of last year, he was again commissioned by Mr. CHARLES ROSS, an English gentleman residing in Madrid, to superintend the working of some calcarone on the former mines of the Spanish Government at Hellin, province of Albacete, and this was also attended with complete success.

The principle on which these calcarone are based, is, immense quantities worked at a low rate. Each calcarone works up per month from 800 to 1000 tons, and these furnaces are made of common stone and plaster, costing about $300 each. No fuel is required, as one-seventh of the ore is used as combustible for reducing the rest; so that if the sulphur ore contained 23 per cent., the furnace would produce 20 per cent. nett. In my next letter I will give the dimensions of these furnaces, and a description of the process. If the directors of the Calcasieu Sulphur Mining Co. are desirous of any information, they can address me as above. I have also made a great discovery for working the ores by a new and cheaper process, which I shall not object to lay before those gentlemen.

Yours faithfully, HENRY SEWELL.

The Origin of Crystalline Rocks.*

By T. STERRY HUNT, L.L. D.

THE origin of the mineral silicates which make up a great portion of the crystalline rocks of the earth's surface is a question of much geological interest, which has been to a great degree overlooked. The gneisses, mica-schists and argillites of various geological periods do not differ very greatly in chemical constitution from modern mechanical sediments, and are now generally regarded as resulting from a molecular re-arrangement of similar sediments formed in earlier times by the disintegration of previously existing rocks not very unlike them in composition; the oldest known formations being still composed of crystalline stratified deposits presumed to be of sedimentary origin. Before these the imagination conceives yet earlier rocks, until we reach the surface of unstratified material which the globe may be supposed to have presented before water had begun its work. It is not, however, my present plan to consider this far-off beginning of sedimentary rocks, which I have elsewhere discussed.†

Apart from the clay and sand-rocks just referred to, whose composition may be said to be essentially quartz and aluminous silicates, chiefly in the forms of feldspars and micas, or the results of their partial decomposition and disintegration, there is another class of crystalline silicated rocks which, though far less important in bulk than the last, is of great and varied interest to the lithologist, the mineralogist, the geologist and chemist. The rocks of this second class may be defined as consisting in great part of the silicates of the protoxyd bases, lime, magnesia and ferrous oxyd, either alone, or in combination with silicates of alumina and alkalies. They include the following as their chief constituent mineral species:—pyroxene, hornblende, olivine, serpentine, talc, chlorite, epidote, garnet and triclinic feldspars, such as labradorite. The great types of this second class are not less well defined than the first, and consist of pyroxenic and hornblende rocks, passing into diorites, diabases, ophiolites and talcose, chloritic and epidotic rocks. Intermediate varieties resulting from the association of the minerals of this class with those of the first, and also with the materials of non-silicated rocks, such as limestones and dolomites, show an occasional blending of the conditions under which these various types of rocks were formed.

The distinctions just drawn between the two great divisions of silicated rocks, are not confined to stratified deposits, but are equally well marked in eruptive and unstratified masses, among which the first type is represented by trachytes and granites, and the second by dolerites and diorites. This fundamental difference between acid and basic rocks, as the two classes are called, finds its expression in the theories of PHILLIPS, DUROCHER and BUNSEN, who have deduced all silicated rocks from two supposed layers of molten matter within the earth's crust, consisting respectively of acid and basic mixtures; the trachytic and pyroxenic magmas of BUNSEN. From these, by a process of partial crystallization and eliquation, or by commingling in various proportions, those eruptive rocks which depart more or less from the normal types, are supposed by the theorists of this school to be generated.* The doctrine that these eruptive rocks are not derived directly from a hitherto uncongealed nucleus, but are softened and crystallized sediments, in fact, that the whole of the rocks at present known to us have at one time been aqueous deposits, has, however, found its advocates. In support of this view, I have endeavored to show that the natural result of forces constantly in operation, tends ro resolve the various igneous rocks into two classes of sediments, in which the two types are, to a great extent, preserved. The mechanical and chemical agencies which transform the crystalline rocks into sediments, separate these more or less completely into coarse, sandy, permeable beds on the one hand, and fine clayey impervious muds on the other. The action of infiltrating atmospheric waters on the first and most silicious strata, removes from them lime, magnesia, iron-oxyd and soda, leaving behind silica, alumina and potash—the elements of granitic, gneissic and trachytic rocks. The finer and more aluminous sediments, including the ruins of the soft and easily abraded silicates of the pyroxene group, resisting the penetration of the water, will, on the contrary, retain their alkalies, lime, magnesia and iron, and thus will have the composition of the more basic rocks.†

A little consideration will, however, show that this process, although doubtless a true cause of differences in the composition of sedimentary rocks, is not the only one, and is inadequate to explain the production of many of the varieties of stratified silicated rocks. Such are serpentine, steatite, hornblende, diallage, chlorite, pinite and labradorite, all of which mineral species form rock-masses by themselves, frequently almost without admixture. No geological student will now question that all of these rocks occur as members of stratified formations. Moreover, the manner in which serpentines are found interstratified with steatite, chlorite, argillite, diorite, hornblende and feldspar rocks, and these, in their

* An extract from the author's address on retiring from the Presidency of the American Association for the Advancement of Science, delivered at Indianapolis, August 17th.

† Amer. Jour. Science, II, I, 25.

* Hunt on Some Points of Chemical Geology, Quar. Jour. Geol. Soc., XV, 489.

† Quar. Jour. Geol. Soc., xv, 489; also, Amer. Jour. Sci., II, xxx, 133.

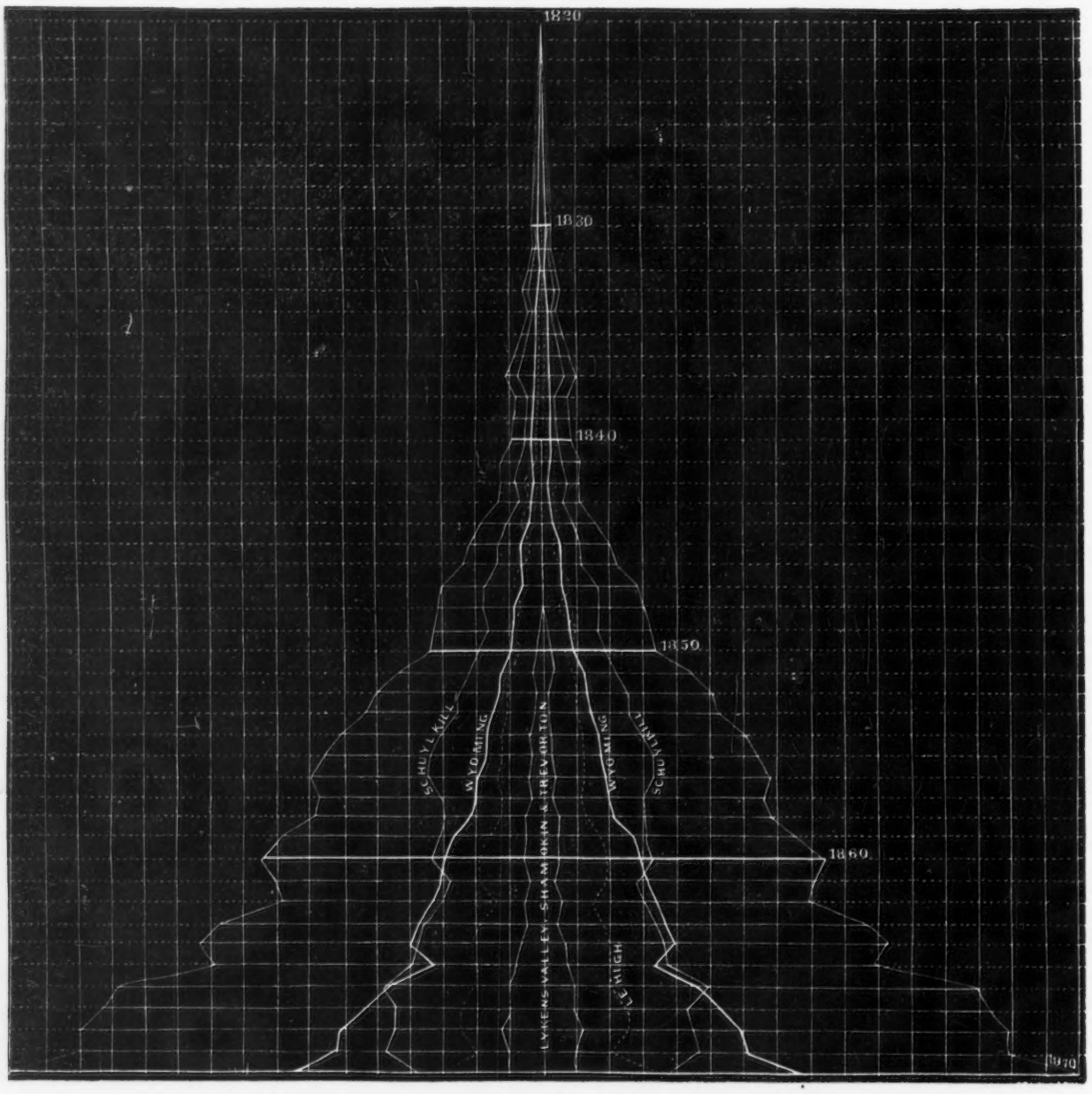
turn, with quartzites and orthoclase rocks, is such as to forbid the notion that these various materials have been deposited, with their present composition, as mechanical sediments from the ruins of pre-existing rocks; a hypothesis as untenable as that ancient one which supposed them to be the direct results of plutonic action.

There are, however, two other hypotheses which have been proposed to explain the origin of these various silicated rocks, and especially of the less abundant, and, as it were, exceptional species just mentioned. The first of these supposes that the minerals of which they are composed, have resulted from an alteration of previously existing minerals, often very unlike in composition to the present, by the taking away of certain elements and the addition of certain others. This is the theory of metamorphism by pseudomorphic changes, as they are called, and is the one taught by the now reigning school of chemical geologists, of which the learned and laborious BISCHOF, whose recent death science deplores, may be regarded as the great exponent. The second hypothesis supposes that the elements of these various rocks were originally deposited as, for the most part, chemically formed sediments, or precipitates; and that the subsequent changes have been simply molecular, or, at most, confined in certain cases to reactions between the mingled elements of the sediments, with elimination of water and carbonic acid. It is proposed to consider briefly these two opposite theories, which seek to explain the origin of the rocks in question, respectively, by pseudomorphic changes in pre-existing crystalline rocks, and by the crystallization of aqueous sediments, for the most part chemically-formed precipitates.

(To be continued.)

The Development of the Anthracite Coal Trade.

WE present to our readers herewith a graphic representation of the rapid growth of the anthracite coal trade during the past fifty years. The sketch was prepared by Mr. P. W. SHEAFER, Geologist and Mining Engineer of Pottsville, Pa., and conveys information in an easily comprehensible way. The figures attached to the monument denote the decades from 1820 to 1870. One can easily ascertain the approximate amount of coal shipped in any year, by carrying the eye to the top or bottom of the cut, along the vertical line, nearest to the outline of the mountain at the end of the given year, and reckoning a million of tons of coal for every division from the central line of the figure. Thus it will be seen that during the year 1840 there were shipped a little less than a million tons of coal, an amount greater than on the preceding year, and less than on the succeeding.



Between 1830 and 1840 there seem to have been temporary relapses of little consequence; but from 1840 to 1860 a uniform progress prevailed. During the war the coal supply fluctuated more than ever before or since, but since then the growth has again been steady, nearly 16 million tons being shipped in 1870, against less than 8 millions in 1861.

When we consider the vast amount of energy represented by 16 million tons of coal, we may well feel that the question of good management and scientific knowledge, on the part of those who direct the vast operations carried on in our coal-fields, cannot be overestimated; and everything which tends to throw light on the subject of coal-mining ought to be welcomed as a general benefaction to the whole country.

The Development of a New Country by Means of Railroads.

THE immediate benefit derived from railroad building through a fertile country, is manifest at several points along the Atlantic and Pacific railroad. While new towns now spring up in the most hilly and uninviting portions of the country, and older towns have grown apace, several new towns and villages have sprung up in Southwest Missouri that have had a most wonderful growth. North Springfield, Pierce City, Verona, Seneca, and other towns have been generally very neatly and substantially built up, since the railroad was completed to those points, and upon inquiry on a late trip, we learned that they have each now a population of about one hundred for each month of their existence: towns fifteen months old have fifteen hundred inhabitants. The future growth of these new towns will depend largely upon the settlement and cultivation of the surrounding country; and this most important matter is as surely influenced by the liberality and enterprise of the railroad company as the thermometer is influenced by heat and cold.

THE COAL TRADE.

B. B. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, Sept. 11, 1871.

WHOLESALE.—The Scranton sale, which took place on Wednesday last, and at which 140,000 tons of Coal were sold, was in every way perfectly satisfactory, and realized an average advance as quoted by the Company of 16c. per ton. The following is the average price obtained for every size. Lump, $4 13½; Steamer, $4 36¼; Grate, $5 04½; Egg, $5 22¾; Stove, $5 55½. Chestnut, $4 53½.

AUCTION SALE OF SCRANTON COAL by the Delaware, Lackawana and Western Railway Company at their sales-room in Exchange Place on Wednesday, Aug. 30th, 1871: 140,000 tons offered, 16,000 of Lump, 12,000 of Steamboat, 27,000 of Grate, 17,000 of Egg, 50,000 of Stove, and 18,000 of Chestnut.

The following table shows the highest and lowest prices obtained, with a comparison of the prices obtained at the last sale in July:

	August 30.	July 26.
Lump	$4 00 @4 17½	$4 25 @4 40
Steamboat	4 32½@4 42½	4 25 @4 30
Grate	5 05 @5 07½	4 80 @4 85
Egg	5 20 @5 25	4 92½@5 00
Stove	5 52½@5 60	5 42½@5 55
Chestnut	4 52½@4 60	4 37½@4 42½

The advance in the price at this sale has imparted a healthy tone to the market, and there is a good, steady demand for good coals. Lehigh is yet scarce, and is to to be had only in small quantities at a time. The following are the Lehigh Coal Exchange prices for September:

NEW YORK LEHIGH COAL EXCHANGE.

NEW YORK, Aug. 31, 1871.

At a meeting held this day, the following prices were adopted for September shipments at Elizabethport, Port Johnson, and Heboken.

Lump	$6 25
Broken	5 75
Egg	5 75
Stove	6 00
Chestnut	5 00

Attest: E. BELKNAP, Secretary.

Coal coming by canal is sold alongside in New York at 25c. advance of these rates. At Newark and New Brunswick the rates are the same as at New York—25c. above the circular rates.

The Delaware and Hudson Canal company make the following quotations *to contractors only* for September: Lump, $4 80; Steamer, $5 00; Grate, $5 40; Egg, $5 60; Stove, $5 95; Chestnut, $5 10. The late heavy rains have caused a break in their canal but not of sufficient importance to delay shipments over a few days.

The Wilkesbarre Coal and Iron Company, quote for September delivery Lump, $4 65; Steamer, $4 75; Broken, $5 40; Egg, $5 50; Stove, $6 00; Chestnut, $4 80; delivered at Hoboken or Port Johnston, N. J.

The Lehigh Coal and Navigation Company quote for their celebrated old Company Lehigh Coal, for September delivery, Lump, $6 25; Broken, $5 75; Egg, $5 75; Stove, $6 00; Chestnut, $5 00; Chestnut, No. 2, $4 25, at Port Johnston, N. J., 25 cents additional alongside at New York.

White, Fowler & Snow, quote for ROOM RUN LEHIGH COAL, which is one of the most popular grades of Lehigh coal now sold, the same rates as old Company. They offer McNeal Lehigh also at the same prices.

Our readers will note that most of these quotations are from 15 to 25 cents above August rates, they will now see how much they have lost by not taking our advice and laying in stocks two months since. We now warn them that coal will continue to advance, while the chances for "drowning out at the mines," freshets at the mines, breaks in the canals and accidents generally to transportation, are augmented as the season grows to a close, and the fall weather sets in. Those of our readers who are at a distance, will do well to take warning and not put the matter off any longer.

We understand that the tolls on the various Railroads will all be advanced this month, and the chances are that coastwise freights will also be greatly augmented.

RETAIL.—All the retail yards are busy as bees, and families are generally taking in coal freely. There has been no change in retail prices since our last.

FREIGHTS.—Vessels are in great plenty. We quote: Boston, $1 65; Providence, $1 40; New Haven, $1.

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending August 26, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	28,141 01	361,895 07	22,81 17	738,8 1 06
" Canal	1,081 05	7,947 07	1,086 03	12,918 11
Total	29,292 06	369,842 14	23,902 00	751,751 17
Decrease	1871. 381,907 03 tons.			

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending August 26, 1871, compared with week ending Aug. 27, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	116,167	1,640,978	105 929	2,290,313
Schuylkill Canal	2,7507	175,528	3 ,588	597,813
Lehigh Valley R. R.	64,524	2,058,738	70,993	1,249,876
Lehigh & Sus. R. R.	24,279	622,356	35,963	721,553
Lehigh Canal	28,113	398,739	32,106	334,965
Scranton North	20,554	486,093	22,439	251 171
" South	30,635	1,153,040	42,253	595,184
Penn. Coal Co., rail	23,816	736,831	28,121	361 895
" " " canal	1,086	12,919	1081	7,947
Del. & Hud. Canal Co.	47,798	1,031,572	44,109	510,757
" " East	6,092	247 891	7,896	177,040
" " West	2,461	53,609	4,721	56,304
South	8,360	298 760	10,529	166,014
Shamokin	16,718	280,159	13,123	415,948
Trevorton	3,131	53 281	....	....
Lykens Valley Coal Co.	2,374	33,9 5	2,255	59,047
Wyoming South	11,444	179,126	....	....
Wyoming North	....	....	....	4,167
P. N. Y. C. & R. R. Co.	6,266	136,658	....	104,987
Williamstown Co'y	6,864	192,066	....	....
Big Lick Col	3,448	48,431	4,311	91,861
Total	450,637	9,902 730	456,477	8,000,752
1870		8,0.0,752	450.637	
Decrease		1,901,978		
Increase				5,840

* Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending August 26, 1871, compared with week ending Aug. 27, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. Canal	16,378	337,420	13 631	424,649
C. & O. R. R.	15,148	538,440	26,630	865,027
H. & B. T. R. R.	5 036	200 707	3,520	220,307
Harrisburg & D.	13,474	508,414	13,697	523,904
*L. V. R. R.		9,380	7,876	262,677
P. & N.Y.C. & R. Co.	6,130	162,266		
Cumberl'd Branch Canal	2,261	61 382	5,580	124,678
" Railroad	2,909	67,381	915	47,865
Total	61,336	1,886,390	71,849	2,409,107
			61,336	1,8·6,390
Increase.			10,513	522,717

The tonnage of the P. & N. Y. C. & R. R. Co. is included in hat of the L. V. R.R. Co.

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending August 26—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	37056 02	28150 07	753298 03	779331 18
Upper Lehigh Region	4118 11	3619 00	39.82 10	93829 00
Beaver Meadow Region				
Hazleton Region	10324 05	9536 05	75553 13	186569 02
Mahanoy Region				
Treskow Region	2655 10		26810 02	
Mauch Chunk Region	6420 18	5681 00	115696 08	40909 17
Totals	60575 06	46988 12	1010930 13	1100539 17
Increase	13.86 14			
Decrease			89609 04	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	35962 18	24279 00	721553 06	622355 14
Forwarded East of Mch Chunk by Canal	18714 12	16630 17	182760 18	300117 00
Delivered at and above Mauch Chunk	1204 07	1200 19	37074 13	27693 08
Delivered to L. & B. R. R. at Plymouth Bridge	4121 04	4051 16	47095 12	133988 19
L. V. R. R. at Packer'n	572 05	826 00	2.446 04	16384 16
Totals	60575 06	46988 12	1010930 13	1100539 17
Of the above there was transported on acc'nt of L. C. & N. Co.	10205 14		161138 11	41823 02
W.-B. C. & I. Co.	23440 00	5683 00	539998 18	355634 17
	33645 14	15134 14		
Totals	12828 02	20817 12	701137 09	397457 19
Increase			303679 10	
Decrease				

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, August 26, 1871:

	tons. cwt
From St. Clair	36,294 01
" Port Carbon	9,871 02
" Pottsville	1,572 17
" Schuylkill Haven	30,145 04
" Auburn	9,238 04
" Port Clinton	18,651 14
" Allentown and Alburtis	184 15
" Harrisburgh and Dauphin	13 697 04
Total paying freight	119,626 08
Coal for Company's use	4.089 15
Total for week	123,716 23
Previously this year	2,723,647 04
Total	2,847.363 09
To same time last year	2,194,177 15

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, August 26, 1871.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	27,948 00
" Port Clinton	2,640 00
Total for week	30,588 00
Previously this year	567,224 18
Total	597,812 18
To same time last year	175,627 11

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending August 26, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	16,894 11	336,161 16
" Hazleton	50,222 00	661,08o 08
" Upper Lehigh	131 12	1,227 05
" Beaver Meadow	19,751 13	232,975 11
" Mahanoy	10,281 18	344 ·34 16
" Mauch Chunk	81 11	6,723 01
" Sullivan & Erie	82 07	225 12
Total Anthracite	97.423 12	1,572,996 09
Bituminous Coal from all sources	7.876 00	262,677 00
Total by rail and canal	105,299 12	1,835,673 09
Same time last year	86,393 14	2,587,656 19
Increase	18,906 08	
Decrease		751,983 10
Forwarded East from Mauch Chunk by rail	70,993 10	1,249,876 06
Same time last year	64,523 14	2,0.8,737 13
Increase	6,469 16	
Decrease		808,861 07

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	70,993 10	1,249,876 06
To N. C. R. R., at Mount Carmel		3,584 02
Forwarded North from L. & B. Junction	11,575 00	162,870 19
To L. & S. R. R. at Packerton for rail		
Delivered at M'h Chunk	129 11	3,948 08
Delivered on line of road above Mauch Chunk		688 04
Delivered above Mauch Chunk	307 15	6.6 6 10
for use of L. V. R.R.	1,2.8 06	33,688 14
To L. & S. R. R., at Penn Hav., for railroad		94 10
Do for canal	10,000 10	79,326 14
At M. Chunk for canal	3,189 00	32,242 02
Total Anthracite	97,423 12	1,572,996 09
Bituminous Coal	7,876 00	262,677 00
Total all kinds	105,299 12	1,835,673 09

This report includes all Bituminous Coal carried over the Lehigh Valley and P. & N. Y. Railroads from December 1st, 1870, to date.

Lehigh Canal Coal Trade.

Shipped for the week ending August 25, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region	10687 07	138665 09
" " Beaver Meadow "	3002 01	25610 06
" " Treskow "	1350 03	10748 00
" " Mahanoy "	186 10	3252 09
" " Hazleton "	10198 12	74778 19
" " Upper Lehigh "	919 03	7474 12
" " Wyoming "	5761 13	74435 04
Total	32105 18	334964 19
Corresponding week last year	28113 01	398739 02
Increase	3992 17	
Decrease		63774 03

RECAPITULATION.

Report of Coal transported over the Lehigh Canal and L. & S. Div of Central Railroad of New Jersey for the week ending August 26, 1871, and for the year 1871.

	WEEK.	YEAR.
Forwarded East of Mauch Chunk by Rail	35,·63	721,553
Delivered at and above do.,	.... 1.204	37,075
Forwarded East of do., by Canal	32,106	334.965
	69,273	1,093,593
Corresponding period last year—		
Forwarded East of Mauch Chunk by Rail	24,279	622,356
Delivered at and above do.,	 1,201	27,693
Forwarded East of do., by Canal	28,113	398,739
	53,593	1,048,788
Increase on Railroad	11,687	108,579
Decrease " "		
Increase on Canal	3,993	
Decrease " "		63,774
Of the above there was transported on account of—		
Lehigh Coal Nav. Co	20,·93	299 8·4
Wilkesbarre Coal & Iron Co	23,440	5·9,999
	44,333	8·9.·03
Corresponding period last year—		
Lehigh Coal Nav. Co	13,931	73,101
Wilkesbarre Coal & Iron Co	15,135	355.635
	29,066	428,736
Increase	15,2·7	411,0·7

Shamokin Coal Trade.

For week ending August 26, 1871	13 123 02
Same time last year	16 718 11
Increase	
Decrease	3,595 09
Total amount shipped to date	415,948 00
Same time last year	280.159 02
Increase	135,788 18
Decrease	

Delaware, Lackawanna & Western Rail Roa Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending August 26, 1871.

	Week. Tons Cwt.	Year. Tons. Cwt.
Shipped North	22,438 16	251 171 10
Shipped South	42,351 11	579.184 07
Total	64 790 07	830 353 17
For the corresponding time last year:		
Shipped North	20.554 09	486,0·3 01
Shipped South	30,635 06	1.153,040 10
Total	51.189 15	1,639,123 11
Increase	13,600 12	
Decrease		808,767 14

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, August 26, 1871.

	WEEK.	SEASON.
North	58,420 19	721,517 01
South	10,529 02	166,014 04
Total	68,950 01	887,531 05
Corresponding time in 1870:		
North	40,996 12	1,474,807 12
South	8,360 02	298,760 00
Total	49,356 15	1,773,567 12
Increase North	19,593 06	
Decrease South		
Total decrease		886,036 07

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending August 26, 1871.

	WEEK.	SEASON.
By Delaware and Hud. Canal	44,109 00	510,757 00
By Railroad East	7,596 00	177,040 00
" West	4,721 05	56,304 05
" South	10,529 00	166,014 00
TOTAL TONS,	67,255 00	910,115 00
For the same period last year.		
by Delaware and Hudson Canal	47,798 00	1,031,572 00
By Railroad East,	6092 00	247 891 00
" West,	2461 00	53,609 00
" South,	8360 00	298,760 00
TOTAL TONS,	64,711 00	1,631,832 00
Decrease		

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Aug. 12, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B. & O. R.R. C. Tons. Cwt	Total. Tons Cwt
1871	13,630 16	26,630 08	40,261 04
1870	16,377 11	15,148 10	31,526 01
Increase		11,481 18	8,735 03
Decrease	2,746 15		

YEAR.

871	424,649 07	805,027 05	1,229,676 12
870	337,420 00	538,439 13	875,859 13
Increase	87,229 07	266,587 12	353 816 19
Decrease			

Cumberland Branch

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons Cwt.	Total. Tons. Cwt.
1871	5,579 12	914 12	6,494 04
1870	2,261 06	2,908 18	5,170 04
Increase	3,318 06		1,324 00
Decrease		1,994 06	

YEAR.

1871	124,678 04	47,865 04	172,543 08
1870	61,381 13	67,381 05	128,762 18
Increase	63,296 11		43,780 10
Decrease		19,516 01	

Huntington and Broad Top R. R. Co.

For week ending Aug 26, 1871	3,520 tons.
Same time last year	5,036 "
Increase	
Decrease	1,516 "
Total amount shipped to date	220,307 "
Same time last year	200,707 "
Increase	19,600 "
Decrease	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, Sep. 1. R. A.	W. A.	AT PHILADELPHIA. Sep. 1. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$— —	— —	— —
Steamer	6 00	— —	— —	4 50
Broken	5 75	— —	— —	— —
Egg	5 90 —	— —	5 00	— — 4 75
Stove	6 00 —	— —	5 00	— — 5 00
Chestnut	4 60 —	— —	— —	— —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	6 50	——	— —	— —
Broken	6 00	— —	— —	— —
Egg	6 00	— —	— —	— —
Stove	6 25	— —	— —	— —
Chestnut	5 25	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 6 00@6 25		— —	— —
New England	"	—	— —	— —
Locust Mountain	W. A.	6 50	— —	— —
Honey Brook, Leh'h	W. A.	5 00@6 25	— —	— —
Spring Mountain	" "	5 00@6 25	— —	— —
Sugar Creek	" "	5 00@6 25	— —	— —
Sugar Loaf	" "	5 00@6 25	— —	— —
Old Comp'y's.	" "	5 00@6 25	— —	— —
Cross Creek	" "	5 00@6 25	— —	— —
Room Run	"	5 00@6 25	— —	— —
Girardville	" "	—	— —	— —
McMichael	" "	— —	— —	— —
Shamokin	" "	5 25	— —	— —
Lykens Valley	" "	5 75	— —	— —
Broad Top	" "	5 25	— —	— —
Hill & Harris	" "	— —	— —	— —
Henry Clay	"	— —	— —	— —
Powelton	"	5 25	— —	— —

*Dealers in these coals may be found in our advertising columns.

Line Prices for Coal Sept, 1871,

	Lump	Broken	Egg	Stove	Ches't
At Mauch Chunk	4.50	4.00	4 00	4.25	3.50
" Wilkesbarre	3 75	2.75	2.75	4.00	3.25

Company Coals.

Sept, 1871.

	L.	Str.	Gra	Eg.	Sto.	Ches.
*Scranton at E. Port	— —	— —	— —	— —	— —	— —
*Pittston at Newburgh	4 90	4 90	5 10	5 20	5 50	4 80
*Lackawana at Rond't	4 80	5 00	5 40	5 60	5 95	5 10
Wilk'b're at Hoboken	4 65	4 75	5 40	5 50	6 00	4 80
Old Co. Lehigh at Pt John'n	6 25	— —	5 75	5 75	6 00	5 00
Lehigh at Eliz. Port	6 25	— —	5 75	5 75	6 00	5 00

For freights to different points see "Freights."

* To contractors.
* None to sell.

Prices at Baltimore—Sept, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 25@5 50
Pittston and Plymouth, do	5 25@5 40
Shamokin Red or White Ash, do	5 25@5 40
Lykens Valley Red Ash, do	— —@5 80
Zerba Valley	— —@— —
Treverton	— —@— —
By retail, all kinds per ton of 2240 lbs.	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	— —@4 75
Fairmount and Clarksburg gas, f. o. b. at L. Point	6 00@6 50
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein, f.o.b. at Phila	$ —
Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. " "	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

Sept, 1871.

George's Creek and Cumberland f. o. b. for shipping...$4 50@4 60.

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 50@5 75
Lykens Valley	6 00@6 20
Shamokin Red or White Ash	5 50@6 50
Trevorton and Zerba Valley	— —@— —

Prices of Gas Coals.

Sept, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y.

Duty, $1 25, gold

	Coarse	Slack.
Block House	$1 75 @1 75	
Gowrie	1 75 @1 75	

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	$7 00 @— —
Fairmount Gas Coal Co. of N. Y.	7 00 @— —
Despard Coal Co	7 00 @— —
Penn	7 00 @— —
Newburg Orrel Gas	— —@— —
West Fairmount Gas Coal	7 00 @— —

AT PHILADELPHIA.

Powelton	$6 75

TO NEW YORK.

Provincial.	
Sidney	$3 25
Lingan	3 25
Cow Bay	3 37½
Port Caledonia	3 37½
Little Glace Bay	3 25

Freights.—Sept,, 1871

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philadel'a.	Anthracite. From East Port, Port Johnston, and Hoboken.	Anthracite. From Newburg...	Anthracite. From Rondout....
Amesbury			$2 50	$1 75		
Bangor	$2 75		2 25	1 60		
Bath	2 75	2 65	2 35	1 75		
Boston	2 60	2 60	2 25	1 65	180	1 80
Bridgeport	2 25	2 30		1 00	1 10	1 25
Bristol		2 60		1 40		1 55
Cambridgeport			2 35	2 00		
Derby				1 25		
Dighton	2 30	2 35				
East Cambridge				2 00		
Fall River	2 25	2 30		1 40	1 40	
Hackensack				90		
Hartford	2 75	3 00	2 40	1 50		
Jersey City		2 00		60	70	
Middletown				1 25		
Mystic				1 10		
New Bedford	2 50	2 35	2 00	1 40		
Newburyport	2 75			1 75		
New Haven	2 25	2 30		1 00	1 10	1 35
New London	2 25	2 30	1 95	1 25		2 20
Newport				1 40		1 25
New York	2 00	1 90	1 40	55	70	1 40
Norwalk		2 30		1 00	1 10	65
Norwich	2 25	2 30		1 20	1 40	
Pawtucket	2 50	2 50	2 15	1 40		1 50
Portland	2 50	2 60	2 40	1 50		1 65
Portsmouth, N.H	2 75	2 75		1 80		2 00
Providence	2 25	2 30	2 00	1 40	1 50	1 50
Rockport						
Saco	2 75		2 65	1 75		
Sag Harbor				1 20		
Salem	2 60	2 65	2 25	1 80		
Stamford				1 00	1 10	
Stonington				1 25	1 20	
Taunton				1 80		1 40
Warren				1 30		
Washington			1 25			
TO RIVER PORTS.						
Albany		80			55	
Catskill		70			50	
Cocksackie		70			50	
Coeyman's		70			65	
Cold Spring	2 20	70			30	
Fishkill		70	1 60		30	
Haverstraw					60	
Hudson	2 20	2 25			40	
New York					60	
Nyack			1 75		30	
Poughkeepsie					30	
Rhinebeck						
Rondout					75	
Saugerties			1 60		40	
Sing Sing					75	
Stuyvesant					75	
Tarrytown					75	
Troy					55	
West Point			1 75			
Yonkers					60	

Prices of Foreign Coals.

Sept, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 50@12 00
" House "	— —@16 00
" Orrel	12 00@14 00

Per ton 2,240 lbs. ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Foreign and Provincial Freights.

Sept, 1871.

Foreign.	
Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s @18s ton.

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$1 95
For reshipment	1 85

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 85
C. R. R., N. J., Phillipsburgh to Elizabethport	1 26
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 46

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 85
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 26
Shipping expenses	25
Wharfage	10
Total	$2 46

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 85
Morris & Essex R. R. Phillipsburgh to Hoboken	1 25
Shipping expenses	20
Warfage	16
Total	$2 46

TO SOUTH AMBOY.

L. V. R. R.	85
B. & D. R. R.	1 21
Cam. & Am R. R.	
Shipping Expenses	35
Total	$2 41

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	90
C. RR. of N. J. Phillipsburgh to Elizabethport	126
Shipping expenses	25
Wharfage	10
Total	$ 2 51

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven..Toll..$1.25	Freight..90c...$2 15
" Port Carbon	
" Port Clinton..... " 1.18 "	85c.... 2 02

Drawback 15 cents during August.

TO NEW YORK.

From Schuylkill Haven ....Toll..1 10 Freight..$1 85..$2 95

The Rates of Toll on Lump and Steamer Coal will be ten per cent less than the above rates. The charge will be per ton of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA

Lehigh Canal	$ 76
Freight and towage	1 10
Total	$1 86

TO NEW YORK.

Lehigh Canal	$1 48
Morris Canal, Freight, Towing	208
Total	$2 56

TO JERSEY CITY.

Lehigh Canal	$ 48
Morris Canal, Freight	2 06
For re-shipment	2 54

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 76
Delaware Division Canal	38
Delaware and Raritan Canal	
Freight	1 25
Towage	20
Total	$2 59

TO NEW BRUNSWICK.

Lehigh Canal	$ 76
Delaware Division Canal	
Delaware and Raritan Canal	38
Freight	1 25
Total	$2 39

MARKET REVIEW.

FOR THE WEEK ENDING SEPT. 2, 1871.

IRON.—The market for Scotch Pig has been rather quiet since our last. The high prices now current have had a tendency to check business, and nothing has been taken but small parcels to supply immediate necessities. Sales have been made of 200 tons Gartsherrie at $36 from yard, and $34 50 from ship, and 100 do. Glengarnock $35 from yard. There are very few parcels of American obtainable, and the market for this description is consequently rather quiet, with prices in sellers' favor; 200 tons Lehigh sold at $37 for No. 1, and $35 for No. 2. New

Rails have been quiet, but the stock is light, and prices are maintained. The sales are 1,000 tons 56 lb., English, to arrive at New Orleans, at $60, gold, nine months' credit; 1,000 do. old T., October delivery, and 800 do. Double-headed sold on private terms. Refined Bar is firm, and rather more active at the advance agreed upon last week, as published in our last paper, and all appearances still indicate an upward tendency.

COPPER.—New Sheathing is steady at 30c., and Braziers and Bolts 32c., Bronze and Yellow Metal Sheathing 22c., and Y. M. Bolts 24c., cash. Ingot is quiet, but, if anything, rather firmer; the transactions embrace 150,000 lb. Lake Superior at 22½@23c., cash.

LEAD.—The demand for Pig is limited, and we hear of no sales; the quotation for ordinary Foreign remains at $6 10, gold. Bar, 9¼c., Sheet and Pipe 10½., and Tin-lined Pipe 15c., all less 10 per cent. to the Trade.

STEEL is unchanged.

SPELTER.—The market remains very quiet, and prices are nominally as before, say $5 75@$6 12½, gold, Foreign; Domestic 7c., currency.

TIN.—The principal business in Pig has been in English, which has moved freely, the transactions embracing 95 tons, half to arrive, at 34½@35c. In Straits we only hear of 100 slabs at 36½c.; the quotations at the close were for Straits 36½@36¾c., English 35@35½c., and Banca 40½@41c., all gold. The English quotation given in our last was for *Straits*, not English, as printed. The latest figures from the other side are English £135 10s., and Straits £134. In Plates there is not much activity, but prices remain steady. Sales have been made of 700 bxs. ½d X at $8 75 for I. C.; 600 do. Charcoal Terne, $8@8 25; and 250 do. Coke Terne, 14 by 20, $7 12½, all gold.

ZINC.—Sheet, Foreign, 9½c., gold; Manganese, Black Oxide, 4½c.; Manganese, Pyrolusite, 90 per cent., 5½.

METALS.

NEW YORK, Aug. 31, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, $7 ₱ ton; Polished Sheet, 3 cts. ₱ lb; Galvanized 2½; Scrap Cast, $6; Wrought, $8 per ton.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	33 00@36 50
Pig, American, No. 1	36 00@37 00
Pig, American, No. 2	34 00@35 00
Pig, American, Forge	33 00@34 00
Bar Refined, English and American	76 00@77 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes	107 50@122 50
Bar, Refined, ord'y sizes	82 50@ — —
Bar, Refined, ¼ @ 5-16 inch	— —@ 87 50
Bar, Rlfined, 1 & 1¼ by ¼ & 5-16	— —@ 90 50
Bar, Refined, 2½ to 3 Rouud & Square	— —@ 90 50
Bar, Common	— —@ 87 00
Scroll	102 50@132 50
Ovals and half-round	100 00@125 00
Band	— —@ 97 50
Horse Shoe	97 50@102 50
Rods, ¾ to 3-16 inch	87 50@122 50
Hoop	105 00@147 50
Nail rod	6¾@ 7 —
Sheet, Russia, as to assortment (gold)	13½@13½
Sheet, Single, D, and T. Common	—4½@— 5¾
Sheet, D. an T. Charcoal	—5¾@—6¾
Sheet, Galv'd, Nos. 14 to 26 30 ct. dis.	12@14c ₱
" " Nos. 27, 28, and 29. 30 ct. dis.	15@18c ₱
Rails, English (gold), ₱ ton	57 00 @— —
Rails, American, at Works in Pa.	69 00 @71 00

STEEL.—Duty: Bars and Ingots, valued at 7 cents ₱ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 3½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15	@— 18
English Spring (2d and 1st quality)	— 7	@— 10
English Blister (2d and 1st quality)	— 10	@— 17
English Machinery	— 11	@— 13
English German (2d and 1st quality)	— 10½	@— 12
American Blister "Black Diamond"	— —	@— 12
American, Cast, Tool do.	— 15	@— 16
American, Spring, do.	— 9	@— 11
American Machinery, do.	— 10	@— 11
American German, do.	— 9	@— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	36 @— 38
Copper, Old Sheathing, &c. mixed lots	— @— 19
Copper, old, for chemical purposes, 14@16 oz.	20 @— 21
Copper, American Ingot	22½@— 23
Yellow Metal, New Sheathing & Bronze	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs	$— —	@— —
Spanish (gold)	6 05	@6 10
German, do.	6 05	@6 10
English, do.	6 15	@6 50
Bar (net)	9 25	@ —
Pipe (net)	— —	@10 25
Sheet	— —	@10 25

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ₱ lb.

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (god) p. 100 lb. 5 75 @ 6 12½
Plates, Domestic p. lb. — 7 @— 11

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent.; Roofing 25. ad val.

	Gold ₱ lb.
Banca	40½@41
Straits	36½@36¾
English	35 @36½

PLATES. *Fair to Good Brands.*	*Gold.*	*Currency.*
I. C. Charcoal, ₱ box	$8 62½@9 00	$10 25 @10 75
I.C. Coke	7 50 @8 50	9 00 @10 00
Coke Terne	6 25 @7 50	7 25 @ 9 00
Charcoal Terne	8 00 @8 50	9 50 @ 10 00

ZINC—Duty: Pig or Block, $1 50 ₱ 100 lb.; Sheet, 2½cts. ₱ lb.
Sheet, No. 9 Foreign ₱ lb.— @— — 9 @9½

San Francisco Stock Market.

"By Telegraph."

The following report from the San Francisco Mining Stock Board is dated California, Aug. 29. Yellow Jacket and Imperial have each fallen 50c. per share. All other stocks on the list are stronger. No sales of Amador have been made since the 10th inst.; it then sold for $265 per share. Its present value will not materially vary from that, judging from a comparison with the present quotations of the list. Sales of Crown Point & Hale and Norcross were effected on the 25th inst. at $280@$78½ per share, "respectively."

Savage	42½
Yellow Jacket	67
Kentuck	141
Chollar Potosi	35½
Gould & Curry	110
Belcher	275
Imperial	41
Amador	No Sales
Crown Point	No Sales
Hale & Norcross	—

Mining Stocks.

NEW YORK, August 31 1871.

A slight improvement is noticeable in mining stock operations, both as regards a slight advance in mining stocks and also a very slight increase in sales of the same, The only exception to the advance of the market is Gregory, which is quoted firm at 30c., at which point 100 shares were sold this A. M. One hundred shares of La Crosse sold at 20c., and yesterday 200 shares of the same stock sold at 19c. in miscellaneous stocks. Wallkill Assent "Lead" is qoted at 02. The report of the Board is as follows:

GOLD STOCKS.

	BID.	ASKED.
American Flag	10	—
Bates & Baxter	25	—
Benton	—	5
Black Hawk	35	—
Central Gold	—	7
Cons Gregory	30	35
Grass Valley	7	—
Gunnell	15	—
Holman	—	—
La Crosse	18	20
Liberty	—	—
Mariposa prf	—	—
Montana	—	—
Rocky Mount	—	5
Quartz Hill	—	30
Smith & Parmlee	23	—
N. Y. & Eldorado	—	—

Our report of operations from the Mining Stock Board in reference to "Petroleum" is not of very great interest, the only changes to be recorded are a slight advance in Central and New York & Allegheny. Every other item on the list remains precisely as reported in our last. No sales.

PETROLEUM STOCKS.

	BID.	ASKED
Bennehoff Run	20	—
Bergen Coal and Oil	15	—
Bliven Oil	30	—
Blood Farm	—	50
Breevoort	30	50
Buchanan Farm	40	—
Central	58	—
Clinton	—	—
Home	150	—
National	15	—
New York & Allegheny	80	—
Northern Light	35	—
Phillips Pet	—	15
Pithole Creek	—	100
Rathbone Oil	20	25
Rynd Farm	33	—
Second National	—	40
Sherman & B	—	—
Tarr Farm	—	—
United Petroleum Farms	28	35
United States	—	60
Hoffman	—	—

Missouri Iron Ores.

THE shipments of Missouri iron ores, during the first six months of the present year, are nearly twice those of a corresponding period last year. For instance, the shipments from January 1 to July 1, 1870, amounted to 65,513 tons; during the corresponding period this year, the shipments footed up 117,542 tons. From the number of new iron banks being opened, some of them being of rare and desirable varieties; and considering the improvements contemplated in transportation facilities, we believe the first six months of 1872 will show the present shipments quadrupled.—*St. Louis Journal of Commerce.*

A New Coal Discovery.

IN sinking a well near New Berlin Station, sixteen miles east of Jacksonville, the Toledo, Wabash and Western Railroad Company have unexpectedly cut through a vein of coal, seven feet thick, at a depth of seventy feet. The quality is similar to that at Lace's mines, fourteen miles farther east, at the C. and A. Junction, but is about two hundred feet nearer the surface.

Colorado Fossils.

ABUNDANT evidence in the shape of fossil remains, is to be found in that portion of Colorado lying east of, and contiguous to the base of the mountains, extending from north to south the entire length of the Sierra Madre, that this region has had a tropical climate. Fossil lions, tigers, leopards, and other tropical animals have been found in Nebraska, several degrees north of us. We have sections of an elephant's tusk picked up on the range between Fairplay and Breckenridge. Of vegetable remains, the tropical fern, the palm leaf, the lemon, and the cocoanut, are found in abundance. In the clay formation overlaying our coal measures the perfect impression of immense palm leaves are found on all hands. In sinking a shaft near Erie, the Rev. VAN VALKENBURG found the impression of palm leaves four feet long at almost every foot he descended. Elsewhere we have mentioned a petrified lemon now in his possession. In a lime ledge near Boulder are petrified cocoanuts in large numbers. Besides our remarkable coal measures, fifty-two feet in thickcess, all evidenlty of vegetable origin, point unmistakably to the fact that these things were produced by the same influences now found in tropical regions. Now the question arises, and to which the attention of scientific men is directed, when and how were they produced? Did we once have the equator where we now are1 If not, then how have we these formations here? And if so, then what produced the change, and placed their poles where they now are? Was the change sudden or gradual? Could the upheaval of our mountain range, running from pole to pole, have so disturbed the balance as to cause the earth to swing round? These are serious questions that science may throw light upon some time in the future.—*Colorado, Miner*

Kansas Pacific Railway.

The Short, Favorite and only All Rail Route

TO

Denver,	**Colorado Springs,**	**Cheyenne,**
Georgetown,	**Villa La Font,**	**Salt Lake City,**
Golden City,	**Idaho Springs,**	**Elko,**
Erie,	**Greeley,**	**Reno,**
Longmont,	**Evans,**	**Sacramento,**
Central City,	**Green City,**	**Marysville,**
New Memphis,		**San Francisco.**

And all points in

Kansas, Colorado, the Territories, and the Pacific Coast.

188 MILES the Shortest Line from Kansas City to Denver.

210 MILES the Shortest Line to Pueblo, Trinidad, Santa Fe, and all points in New Mexico and Arizona.

Remember that this is

THE GREAT THROUGH LINE,

and there is

NO OTHER RAIL ROUTE

to any of the above points.

There is no tedious omnibus or ferry transfer by this route as the Great Rivers are all Bridged.

PULLMAN PALACE CARS

RUN THROUGH FROM KANSAS CITY TO DENVER

Without Change.

Passengers by this route have an opportunity of viewing the fine Agricultural, Districts of Kansas, and can stop over at Denver and visit the rich Mining, Agricultural and Grazing Districts of Colorado.

Close connections made at Kansas City with all trains to and from the East, North and South.

Be sure to ask for Tickets via Kansas City and the

KANSAS PACIFIC RAILWAY.

EDM'D S. BOWEN, GEN'L SUPT.

BEVERLEY R. KEIM, Gen'l Ticket Ag't.

GENERAL OFFICES—Kansas City, Mo.

DEPARTMENT OF POPULAR SCIENCE.

Darwin's Hypothesis of the Origin of Species.

V.

HIGHLY fascinating illustrations of natural selection have been found in the phenomena of mimicry or protective resemblances; and this class of facts was for a long time triumphantly used by the Darwinians in support of the hypothesis. The force of the argument has been weakened somewhat by the close analysis of MIVART and others; but as I am merely stating, not discussing, the theory, I shall give it substantially as it is found in the pages of DARWIN and WALLACE.

Among the simplest means of mimicry is color. The color of an animal is not purely accidental. Wild species do not usually vary much in color, though when they are domesticated they begin to vary; because their color no longer has anything to do with concealment, which enables them to catch their prey, or escape their enemies.

Desert animals, as a rule, are desert-colored. Lions, antelopes, camels, kangaroos, the original wild horse. Desert birds are still more strikingly concealed by their color. Also arctic animals. The arctic fox, the ermine, and the alpine hare change to white in winter only; but the American polar hare is white all the year round, living in perpetual snow. The sable retains its rich brown; but it subsists on fruits and berries, and is so active as to catch small birds on the branches of trees. The Canada woodchuck is also dark-brown, but it catches fish and small animals near the water, and, living in burrows, does not need color for concealment in winter.

Mice, rats, bats and moles possess the least conspicuous of hues. Owls have those mottled colors that will protect them day and night.

Only in the tropics, among forests which never lose their foliage, do we find whole groups of birds whose chief color is green—such as parrots.

Many fishes are protected by their color.

But the most wonderful protective resemblances are found, as we might expect, among insects. For this class is least protected from its foes in other ways. Moths, butterflies, grasshoppers, bugs, etc., closely resemble the flowers or the leaves or twigs which they frequent, *e. g.*, the Phasmida or walking-stick family, and especially the genus Phyllium or walking-leaf.

The hypothesis of natural selection explains these facts as follows. Note, for instance, the rarity of white in wild species of beasts and birds, in temperate regions. Yet tame ones vary to white as much as to any other color. The white individuals are more likely to be perceived and destroyed, or if beasts of prey, to be avoided, and so starved, than the less conspicuous ones. Whenever a species strays into an arctic climate, this condition is changed; and the white varieties have an advantage.

But if this explanation is true, it may be asked, how does it happen that so many birds, snakes, insects, etc., all over the world, are brilliantly colored? As I have already remarked, the habits of different creatures must be considered. Thus the colors most conspicuous in one place might be the very best adapted to concealment in another.

But a still more important consideration is the fact that color is by no means the only protection possessed by animals. Porcupines, turtles, and skunks are illustrations of other means of defence. The number of young, and the care taken of them by their parents, may protect the species in spite of enemies.

Some insects are luminous; many have stings; some are hard and prickly, so as to be unpalatable; and great numbers possess unpleasant smell or taste. When these safeguards are efficacious, color becomes less important. Thus there is no instance on record of a wasp or hornet colored so as to resemble a vegetable or inanimate substance. They are generally showy and brilliant. There is in South America a large family of butterflies, called the Heliconidæ, which afford an excellent illustration of the protection in spite of color. They abound in forests frequented by insectivorous birds; they are slow flyers with large and conspicuous wings—bearing most frequently spots or patches of yellow red or pure white upon a dark ground. Even the under side of the wing is equally gaudy; so that when they go to roost, as it were, and fold up their wings in butterfly fashion, they are as conspicuous as ever. What renders them so careless and yet so safe, that they are the most numerous of all the butterfly families in certain districts, and yet, so far as we can find out, they are not eaten by the hungry enemies of their class? It is highly probable, say the naturalists, that the Helicons are protected by a pungent medicinal odor and by a thick yellow liquid which exudes from them when crushed. These are so disagreeable to birds and other insect-feeders that they have gradually learned to avoid the Helicon family. If this hypothesis be true, the more conspicuous these butterflies are, the more easily and certainly they will be avoided.

But this avoidance would follow from a recognition at a distance; and if any other butterfly looked like a Heliconid, it would be likely to be let alone likewise, always supposing the eatable variety were considerably less numerous than the ill-smelling and ill-tasting one.

If we suppose that another family of butterflies, palatable to birds, were in danger of extinction, and that some individuals of the family had a slight bad taste, while others had a slight outward resemblance to the Helicon; it is evident that the bad taste would be less protection at first than the outward resemblance. In one case, the individual would still be mistaken for an eatable butterfly, and maimed or killed as such; in the other case, he would be mistaken for a Helicon, and let alone. Natural selection would, therefore, in this case, perpetuate an external mimicry or protective resemblance.

Now, this case actually occurs in the South American forests. A distinct family of white butterflies contains a genus called *Leptalis*, some of the members of which are white, while the greater number resemble in form and color of their wings the Heliconids. They are few in proportion to the latter—say only one to a thousand—and this resemblance apparently protects them.

ONE more instance of mimicry will suffice. Like the preceding, it is adduced by Mr. WALLACE. Near Rio Janiero occur two kinds of hawks, one an insect-eater, and the other a bird-eater, which closely resemble each other, having the same ashy tint beneath, and the under wing-coverts and thighs reddish-brown. When on the wing and seen from below, they would be undistinguishable. Now, if this is a case of mimicry by natural selection, we may inquire which bird mimics and which is mimicked. The resemblance cannot be a protection; if useful at all, it must be an assistance in catching prey; and it seems probable at once that the bird-eating hawk is thus assisted, being mistaken by small birds for the insect-eating hawk, of which they are not afraid; hence, that the bird-eater has been bred by natural selection to resemble the other. And this conclusion is corroborated by the fact that the bird-eater is found in other districts not inhabited by the insect-eater, and where this is the case, it is observed to vary in the color of under wing-coverts to white, thus no longer maintaining a resemblance which would be of no use. One additional fact is required, however, to prove this a case of natural selection. In those districts where both occur, the insect-eaters should be by far the most numerous, else the resemblance would merely serve to make small birds afraid of both kinds. But on this point Mr. WALLACE does not inform us.

There are two other lines of reasoning besides the one traced in this series of articles, by which Darwinism is supported, namely, the argument from the physical analogies, relations and groupings of species, and the argument from the geographical distribution of species. The consideration of these, and of the application of the hypothesis to the question of the origin of man, must be postponed to a time, I trust not distant, when I shall again take up this subject, and endeavor to state fairly, and without attempt at "originality," the objections to Mr. DARWIN's hypothesis, and to estimate their weight and range.

R. W. R.

The Very Narrowest Gauge.

A ONE-RAIL railway has been in successful operation between Raney and Montfermeil, near Paris, for two years. The locomotive for a one-rail road has four wheels, two being placed, one at the front and one at the rear of the engine, bearing on the rail. These give the direction, and are double flanged. The other pair of wheels are placed in a traverse plane passing on a line in front of the fire-box. They run on oak plank or macadamized road, as the case may be, and are the driving wheels. This sort of railway can be built in France for about $1000 per mile. The locomotives weigh six and ten tons; the former runs fourteen miles an hour, drawing, besides its own weight, thirty-five tons up a grade of two feet in a hundred; the latter will draw fifty tons at a rate of eight miles an hour, up the same grade; on a level it would draw one hundred and eighty tons. This system is the invention of M. LARMANJAT, a French civil engineer, and many believe that it may be successfully introduced on turnpike roads with the grades and curves which the common highway usually has.—*Ex.*

Sulphur in Coal and Coke.

AT the British Association, Mr. F. CRACE CALVERT, F.R.S., read a paper "On the Estimation of Sulphur in Coal and Coke." He stated that the sulphur found in coal and coke often existed in two states: partly as sulphuric acid combined with lime, and partly as sulphur combined with iron. The sulphuric acid combined with lime did not injure the quality of the iron produced in blast, as it remained in combination with the lime; while the portion existing as sulphuret of iron greatly deteriorated its commercial value. To determine the quantity of sulphur in the former state, Mr. CALVERT proposed to boil the pulverized coal or coke with a solution of carbonate of soda, which decomposed the sulphate of lime. The importance of his process was, he said, shown by the fact that by the old process coals having a certain amount of sulphate of iron would have been condemned as unsuitable for use in the blast-furnace, while they were really good coals for the purpose. In the residue from the above operation was found the sulphuret of iron. This he proposed to attack with oxydizing *aqua regia*, and thereafter with carbonate of soda, and heat it to near the fusing point. By this means, he said, there could be no formation of an insoluble sub-sulphate of iron, and the prevention of precipitation by a salt of baryta, which occurred in a liquor containing free nitric acid, would be avoided.

American Mining Stocks in England.

THE market for Mining Shares on the Stock Exchange during the week has again been active, both for foreign and British descriptions, and especially for the former. Pacific shares have commanded a large share of attention, at an advance of 30s., from the much improved prospects of the mines. The advices from Utah, received principally through private sources (some of which will be seen in another column), are most encouraging, leaving no doubt about the value of these extensive mines. Shares are steady, at former prices. In Eberhardt and Aurora there has been a considerable business. A dividend of £1 per share has been declared. South Aurora shares have been dealt in to a fair extent, and close 5½ to 5¾. Sweetland Creek, Birdseye Creek, and St. John del Rey shares remain about the same in price, but a healthy tone pervades the market.—*London Mining Journal.*

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
WILLARD P. WARD, M. E.,
Editors.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.*

SUBSCRIPTION—**$4** *per annum in advance;* **$2 25** *for 6 Months.*

ADVERTISEMENTS.—*The rates are as follows: Inside pages,* **25** *cents per line each insertion; the outside or last page,* **40** *cents per line. Payment required in advance.*

NEWS-DEALERS *will be supplied through the agency of the* AMERICAN NEWS COMPANY, *No.* 121 *Nassau street, New York City.*

COMMUNICATIONS *of all kinds should be addressed to the Manager. The safest method of transmitting moneys is by checks, or Post-office orders, made payable to the order of* WILLARD P. WARD.

Correspondence and general communications of a character suited to the objects of THE ENGINEERING AND MINING JOURNAL *will always be welcome.*

The Postage on THE ENGINEERING AND MINING JOURNAL *is twenty cents a year, payable quarterly, in advance, at the office where received.*

THE SCIENTIFIC PUBLISHING COMPANY,
WILLARD P. WARD, MANAGER,
37 PARK ROW,
P. O. Box 4404. NEW YORK CITY.

CONTENTS FOR THIS WEEK.

The Mines and Works of the Lehigh Zinc Company.....145
The Twentieth Meeting of the American Association for the Advancement of Science.....146
The Native Sulphur Mines of Spain.....147
The Origin of Crystalline Rocks.....147
The Development of the Anthracite Coal Trade.....148
The Development of a New Country by Means of Railroads..148
THE COAL TRADE.....149
MARKET REVIEW.....150
Missouri Iron Ores.....151
A New Coal Discovery.....151
Kansas Pacific Railway.....151
Colorado Fossils.....151
DEPARTMENT OF POPULAR SCIENCE :—
Darwin Hypotheses of the Origin of Species.....152
The Very Narrowest Gauge.....152
Sulphur in Coal and Coke.....152
American Mining Stocks in England.....152
EDITORIALS :
The Prevention of Steam-Boiler Explosions.....153
EDITORIAL CORRESPONDENCE :
Montana and the Railroad.....153
MINING SUMMARY.....154-155-156
Advertisements.....156-160

The Prevention of Steam-Boiler Explosions.

WE have on previous occasions expressed, with a tolerable degree of plainness, our convictions regarding the use of steam on boats employed in carrying passengers, and we now desire to point out, in as few words as possible, a means of rendering boiler explosions either an impossibility, or of rendering them harmless if they do occur.

Recently we have heard the reliability of the safety-valve, a contrivance on which engineers have relied for many years, very severely criticised, and this naturally leads to the consideration of other methods of securing safety, which may be applied to boilers without in the least injuring the efficiency of the safety-valve.

A contrivance of this sort, which would at the same time be an infallible indicator of low-water in the boiler, might be easily and with but little expense furnished to new boilers, or applied to those already in use, by inserting an ordinary wrought-iron tube of suitable size through the top of the boiler and letting it run down to about the low-water line, *i. e.*, the line which should always be covered by water when the boiler is in operation. This tube should be continued up, alongside of the smoke-stack, till it reached a height of thirty-five or forty feet above the low-water line in the boiler, then bent over and run down the fire-room or the engine-room, as may be found most convenient. This tube should be free from any valves, so that the fireman or engineer could not shut it off.

The principle upon which this apparatus would operate is exceedingly simple, and rests solely upon the operation of natural laws, without the intervention of any mechanism which could, by any possibility, get out of order. A pressure of one pound to the inch is balanced by a column of water twenty-six inches in height. A pressure of fifteen pounds to the inch would require a column of water 32.5 feet, one of twenty pounds a column 43.3 feet in height to balance it. Now, if the lower extremity of this tube, which we propose to apply to a boiler, reached down below the surface of the water, it is evident that the pressure of the steam would, if the tube were high enough, force water from the boiler up in the tube till an equilibrium was established. If the pressure were too great for the height of the tube, water would be forced over the bend at the top, and soon make itself noticable on the floor of the engine-room, thus giving warning to the engineer that the pressure was too great for his boiler. He should then not be at liberty to shut off the stream by means of a stop-cock, but should be compelled to relieve the pressure by opening the safety-valve, opening the furnace doors, or in some other way known to engineers. If the water were allowed to run out in some prominent place, engineers would be pretty careful not to have the thing occur very often. Besides, the affair would not be like a safety-valve, which can be quieted by a little additional weight, but if the water were as high in the boiler as it should be, it would continue to pour out a stream till legitimate means of safety were carried out. If at any time the water became lower than the low-water line, the water in the tube would run back into the boiler, and steam would be forced out of the tube, whatever the pressure might be. Warning of low water would thus be at once given to the engineer.

Twenty-pounds to the inch is probably as high a pressure as should be allowed on passenger boats, and if Congress were to pass a law compelling every man building a new boiler and machinery for a steamboat to erect a tube not more than 43 feet and 3 inches in height and attach it to the boiler, in the way that we have pointed out, we should never hear of a hundred people losing their lives by a boiler explosion on a boat without, at least, being able to fix the blame where it belonged.

EDITORIAL CORRESPONDENCE.

Montana and the Railroad.

HELENA, MONTANA, Aug. 2, 1871.

IN my last letter, I spoke of some of the undeveloped resources of this Territory, and of the effect which the completion of the North Pacific railroad will have upon them. Before proceeding to discuss the mining industry from a similar standpoint, I will say a word with regard to the merchants. The principles upon which business has been conducted in these new Territories are of necessity largely speculative. The mere difference in the cost of freight, between the wagon-road and the railroad, would not account for the high prices put upon goods by the retail dealers. There are other causes, among which the following are prominent. In the first place, the time occupied in freighting is so long as to require a larger capital here than in the East, for the same volume of business. The Montana merchant, buying goods at Chicago, or St. Louis or New York, on a credit of ninety days, has no hope of realizing upon them so as to pay any considerable portion of the notes he gave for them. He must be satisfied to turn over his capital once or twice, instead of four times a year; and of course he must charge higher profits to recompense himself for this disadvantage. Again, the practice of taking gold dust in pay for goods (which has now, I believe, nearly ceased in Montana, the banks and assayers buying the gold, and greenbacks being the currency) leads to high prices in another way. The merchants compete with one another in offering the best rates for the dust. A miner naturally patronizes the shop which allows him the highest value. But of course it is taken out of him in the price of the goods. Finally, the dealer is frequently obliged to give credit to miners, who are wintering, without work, or stripping and preparing their claims. When they begin to clean up from their sluices, if they are successful, he gets his money; if not, he must write the account to profit and loss, or wait for his debtors to "strike it rich" another season. I think it is generally true in this country, that when men get money they pay their debts; on the other hand, when they are "dead broke," they go into a tacit, informal sort of bankruptcy, and are free from liability, the creditors themselves sharing in the public sentiment which disapproves "being hard on a man when he is down." This sort of generous feeling in the community is pleasant to contemplate; but it is demoralizing to business, and can only exist when mining is, on the whole, prosperous, times are "flush," and merchants are able to secure large profits, to cover their large risks and losses.

There is no doubt that the flush times of Montana have passed away. The decline in surface mining; the growing necessity for capital and economy in conducting deeper operations, and the gradual absorption of the claims into the hands of companies, or large owners, necessitate a change in the methods of business; and this change, in turn, requires cheaper and more rapid transportation. The railroad will revolutionize trade; and it certainly will not bring back the golden past to the small dealers. Its effect on many an inflated and precarious business will be what it was in San Francisco upon jobbing houses and real estate speculators. But the people and the Territory will gain immensely by the change; and our mercantile interests will be benefitted in the end by the increase of population and industry, and by the elimination of precarious speculations and bad debts.

No industry in Montana, however, will be so greatly stimulated by the railroad as that of mining. I have satisfied myself already that there remains, even in the gulches, which have been worked for the longest time, a good deal of ground that will be profitable when prices shall have moderated. At present, the expenses of gulch mining in this Territory must average 75 or 80 per cent. of the gross product. Wages and provisions, taxes and water-money are serious deductions, which frequently leave the proprietor of a claim with less reward for his time and pains than one of his own laborers has received. It is no wonder that so many claims are passing into the hands of the Chinese, who are satisfied if they earn a living merely, and whose associations for the working of large claims are models of economical, harmonious and effective coöperation. Both political parties here keep up the farce of denouncing these foreign interlopers; but all men without distinction of party are glad enough to sell out old claims to them. In Alder Gulch, below Virginia City, a large bed-rock flume, owned by KNIGHT & Co, I believe, is worked on shares by Chinamen. The proprietors say they could not pay "white wages;" and not even the wildest political partisan demands that they shall stop, rather than employ cheap labor. At the same time, it is insisted that white labor should be employed, wherever the proprietor "can afford it"—a dubious and scarcely tenable distinction.

It seems at first sight strange enough, that everybody, even those who denounce the cheap Chinese, joins in the general longing for a railroad, and lower prices. The secret is that all these miners who are now working for wages, and striving to keep wages high, are owners of claims here and there, which they mean to work for themselves some day, when

wages are low. It is the transition that troubles them. When it is once made, they will become proprietors, and take advantage of the new state of things.

But after all, it is not the placers, but the quartz mines, that will profit by the railroad. The vast extent and number of the auriferous gulches of Montana indicate a corresponding abundance of quartz lodes; and this indication has already been confirmed by the labors of the prospectors. The gold mines which have been successfully worked are few in number, compared with those which are known and tested, but for one reason or another never actively developed. There are innumerable small but rich veins; and there are large but poor veins. Both these classes require cheap labor and supplies to be successful. Even to send the gold bullion to New York, costs the proprietor 3 per cent. of its declared value; and to draw on New York and cash his draft in greenbacks here consumes a commission of 2 per cent. more. These two items alone united make a respectable dividend of profit.

The silver mines of the Territory are destined to become highly important. I reserve detailed notes of these matters for a future occasion; it is sufficient to say here, that true silver ores and argentiferous galenas are abundant in many localities. In several instances, ores are shipped all the way to San Francisco, at a cost of sometimes $60 per ton for freight alone. When this region is brought into the world by the railroad, there will be a large business in shipping ores and bullion, such as has sprung up in Utah and Nevada.

There are smelting works in successful operation at Augusta (of which you will shortly receive an account) but most of the metallurgical operations in this direction in Montana have been unsuccessful. There is a dearth of skilled workmen. The millmen of Reese River, Cerro Gordo, Georgetown, Eureka, and other districts where refractory ores are either amalgamated or smelted, do not seem to wander hither. I saw ore shipping to San Francisco the other day, which could be treated on the spot, if the man who had tried it and failed had only known how to build and run a common Reese River reverberatory—to say nothing of such improved apparatus as that of STETEFELDT or BRÜCKNER. The trouble is the isolation of Montana; and the panacea is, you see, the railroad. R. W. R.

MINING SUMMARY.

California.

From the Grass Valley *Union* of August 16:

ALTONA MINE.

The Altona gravel mine is looking bettor now than at any other time in its history. The recent crushing of gravel at the Gold Hill mill was more than satisfactory, and the bed of gravel in the mine has already been shown to be very extensive. The condition of the Altona has caused the stock to be songht after, and this seeking has been done by men who are here in Grass Valley and who know all about the condition of the mine. Yesterday were two sales of stock, and 600 shares, in all were sold. One lot of 200 shares sold at $5 per share, and the other of 400 shares sold at $4 per share. From all we can learn about the Altona mine the purchasers of the stock will make money. These transactions were confined, as we have said, entirely to Grass Valley parties.

RICH SPECIMENS.

We saw yesterday at Johnston's furniture store, several very beautiful specimens of gold bearing quartz, which came from the Ophir district, near Auburn, Placer county. These specimens were found in the claims of the "United Miners," which claims are near the St. Patrick mine. The United Miners are CHRIST, JOHNSON & Co., and they own a ledge from which several thousand dollars have been taken, within a few weeks by hand mortar process. The owners are Scandinavians, hard working men and were formerly of Grass Valley. Their fortune is assured.

From the San Diego *Union* of August 10:

MINING ITEMS.

Mr. JAMES HAMILTON has furnished us the following items from the mines. The Antelope mill after running 36 hours cleaned up $1000, being about $50 to the ton of ore. The McMechan mill is running on Madden ore. It is expected that the clean up will show that the Madden is a first-class lead. Ferry's mill is kept busy on Stonewall Jackson ore. Parson's mill will start running on Monday next. GUNN & REYNOLDS are working night and day, crushing ore from the Helvetia. Barley is abundant at 4½ cents per lb., and hay at $15 per ton at Julian.

Colorado.

WARD DISTRICT.

From the Cribou *Post* of July 19: Since we visited this mining camp a few weeks ago, there has been an increase in the business and population of nearly one-half. We know of no place in Colorado where the miners are producing more bullion per man engaged than here. This is by legitimate mining, entirely independent of foreign capital, and hence it may be safely assumed that this prosperity is founded on an enduring basis. The mineral veins here hold the same course as those of Grand Island, and have much the same general character and appearance. They carry gold in Ward, but westward run more to silver. All the main lodes are very long, and strong, easily traceable on the surface for several miles. They are true fissure veins, set in the solid granite formation; and the depth to which such lodes may be worked is practically interminable.

THE WARD MINING COMPANY. — AMES, DIXWELL, and associates, of Massachusetts—E. K. BAXTER, of Central, agent—are opening the Volcano, Belfast, and York lodes, and will put a whim on the Manhattan. Their twenty-stamper, now run by MITCHEL & WILLIAMS, is to undergo thorough repairing in view of continuous work. This mill is supplied with percussion concentrating tables, which, on account of the silicious character of the Ward ores, work admirably. There is already quite an accumulation of concentrated tailings. This company propose the erection of smelting works. They have six hundred consecutive feet on the Princeton, an easterly extension on the Columbian vein, and the same number of consecutive feet on the Manhattan; besides as much undeveloped property amounting in all to above six thousand lineal feet. Their main shaft on the Princeton is 250 feet deep. Their mill building is a costly and substantial structure, 85 by 50.

NI-WOT.—SAM. GRAHAM is driving forward the construction of RICHARDSON'S chlorination works. SMITH & DAVIDSON are running the fifty-stamper to great profit. Their main shaft opens into the mill, and is now 220 feet deep. In the bottom the converging mineral seams are nearly united. It is thought that ten feet more will unite them in one solid crevice ore. We are told their purpose is to sink thirty feet deeper, and then run a level each way. The ore above this level will be broken down by over-hand stoping, while the main shaft is continued downward. The mine is now in condition, the Superintendent reports, to supply RICHARDSON'S works in full. The mine will be worked by running levels, and disclosing the ore in advance of present requirements, in order to ensure a full supply for larger operations. It has been in an unsafe condition, but is now being timbered and made secure. The mill will also be overhauled and put in perfect order. It is reported that DAVIDSON & SMITH are negotiating a sale of a third interest to Mr. GILL, of Denver. It looks as if there would be a stubborn fight for the title to this property.

SURFACE QUARTZ.—The Celestial is one of DEARDOFF'S old discoveries, newly opened, and now worked by BENSON & LONG. The ore prospects for $200 per cord, and there appears to be a great deal of it. The situation, at the head of Spring gulch, is most convenient. The quartz goes to the James Creek mill, the most northern stamper in Colorado. MITCHELL & WILLIAMS, at the depth of sixty feet on the Benton, have passed through the surface quartz to iron and copper pyrites, which run well under stamps.

The following items are clipped from the *Register*:

The results of experiments made in New York recently on ore from the Whale mine in Clear Creek county, has induced the company, who made the tests, to make a proposition to the Whale company that contemplates the erection of smelting works in the large Whale mill, situated on Spanish bar. We learn from Mr. VAUN, Superintendent of the Whale company, that letters of inquiry as to the quantity of ore that could be obtained, were received and replied to in a satisfactory manner, and we may look for the works to be commenced immediately. .....Mr. A. GUIBAR has been taking surface quartz from a lode near the Rosecrans, that pans big. Nothing has been found like it since our Mr. PERRIN panned out those wonderful prospects for HORACE GREELEY in 1859. He is reducing his quartz in arastras, a slow but sure method....We hear it confidently stated that work is to be resumed on the Griffith lode in Georgetown immediately; also that the dressing works of the WILSON & CASS company will be started up by the same parties. A contract is to be immediately let for taking out 300 tons of ore in a short space of time.....The St. Louis smelting works are in course of erection at Carondolet. The officers of the company visited Clear Creek county last week, and have made the necessary arrangements to have samples of ore representing the various lodes in the county forwarded to them, where they will receive a careful analysis. If the results prove satisfactory, an agency for the purchase of ores will be established, and dressing works erected in Clear Creek county at an early day....The Western smelting works above Black Hawk, are running up to their full capacity, being well supplied with ore, as are the mills generally along the creek. The yield per cord from the latter as compared with last year, is somewhat increased, a fact worth noting....It is reported that the east half of the Snowdrift lode, situated on Sherman mountain, Clear Creek county, has been sold in London recently for a large sum of money....The Crosby furnace at Empire has turned out its first charge of roasted ore. It will be amalgamated this week when we hope to give our readers a report of the results.... The Cashier lode, at Empire, is improving in the quality and quantity of the ore produced. The pay vein is now 18 inches thick in the heading of the adit....The Capital lode, near Downieville, is attracting considerable attention. The body of ore is increasing in quantity and richness. An assay made of a choice piece is said to yield 600 ounces per ton in silver.

From the *Miner*: The Stewart Silver Reducing Company has purchased since our last issue six lots of slide ore, averaging from 413 to 880 ounces per ton; nearly a ton from the Ruby lode, Daily District, which milled 175.75 ounces, or $227.38 coin per ton; also, ore from the Alabama, Prince Albert, Phenix and Terrible. They have shipped $2700 coin, being the first bullion produced from the Arey furnace, which they have just got into operation. Within thirty days the bullion shipments will be largely increased. In this connection we will say that the Arey Furnace Company now guarantee that their furnace will work one ton of ore per hour, and chloridize 85 per cent of the silver. Thus another advance is made in the progress of our material industry....The Chrystal lode, at Idaho, is being worked, with good results....The Marshall tunnel has reached a distance of 1120 feet.... The Burleigh tunnel is still being pushed ahead, and has reached a distance of 1145 feet....The Henry Ward Beecher mine, Democrat mountain, has been leased, and active work will soon be inaugurated....A wince is being sunk between the two adit levels on the E Pluribus Unum, in which there is a four inch vein of $600 ore.... The Cliff mine, Democratic mountain, is now being actively worked. It is a good mine, and, will undoubtedly become one of our best producers....WYTHE & Co., keep pegging away on Basin lode, with encouraging indications. They will undoubtedly soon strike it big. It is a good mine and development will make it productive....The Prince Albert, situated on Columbian mountain, is rapidly becoming one of our best ore producers here. The BOWMAN Brothers, are actively engaged in developing, and they are rapidly placing it in a condition for cheap and economical mining....We are informed that the Wilson & Cass Company's mill and mine, the Griffith, have been leased to responsible business men, who will immediately commence mining and dressing ores....The Compass & Square, one of our oldest discoveries, and in '67 one of our most productive mines, is again being worked, with remarkable good success. The mine has always been noted for the extreme rich ore which it produced, and the ore now being obtained in no way detracts from its early reputation. At a depth of fifty feet in the shaft a drift is being run east, in which the ore vein is larger and more productive than in any other portion of the mine that has been worked. The average assay of a lot of ore, not selected, by the ton, is 650 ounces, $845.50 coin value; and a lot partially, not closely selected, 945 ounces, $1,222.54 coin value per ton....PALMER & NICHOLAS have again had a small run, owing to breakages. The mill is nothing but a rattle trap at best, with neither shaft or pulley of sufficient strength to do the work allotted to them. Their bullion shipment for the week are bar 359, 1,352.80 ozs., 952 fine, coin value $1,564.92. Among other lots of ore purchased by them we noticed 1024 lbs, Coney, assay value 60,5 ozs.; 1647 lbs, first-class Horrible, 888 ozs., of Rip Van Winkle....The justly celebrated Silver Plume mine has been sold to an English Company.

Nevada.

The Flko *Independent* of August 19, has the following letter from

COPE DISTRICT.

MOUNTAIN CITY, Aug. 14, 1871.

EDITOR INDEPENDENT: The miners here are still prosecuting their works with unusual vigor, and every day the prospects give more confidence, as most of the mines are proving to be permanent beyond expectations. The Argenta and Excelsior companies are still employing a large force of men on their mines, putting them in shape for extensive operations this Fall. These enterprising companies confidently expect that by the first of October they will be able to employ from forty to fifty miners, and will take out ore enough to run one mill continually. The Independent company is now sinking on its ledge, and has attained the depth of 125 feet, having a well defined ledge of three feet in width, with very rich ore. In a short time the company will begin running levels and stoping out with a large force of men. This company has now about $25,060 worth of ore on its dump waiting on the mills, which are engaged ahead for months. The El Dorado and Monitor mines are looking better than ever before. I visited these mines a few days ago, and must say I never saw so fine a showing of mineral as I found on the dumps of these two mines. The Pride of the West, which is one of the best mines in the camp, is now lying idle, on account of the interference of an imaginary creditor of one of its owners. It is certainly a shame upo i the advisers of these parties who stop the work on so fine a prospect as this mine. The news from Bull Run still continues good, The Ontario is now being worked energetically, having its shaft sunk 70 feet, The ore gets better, as does the ledge, in width, being now over six feet, which is good evidence that the Bull Run mines are not surface diggings. McDonnell Company, Gov. Chillis, Blue Jacket, and many other companies are at work on their mines with flattering prospects. GEO. W. M. COWLES (the prospector who never gets weary) is now working the Champion lode, owned by COWLES, DUVALL and others, and which is likely to prove one of the best mines in that district. A piece of rock taken from this mine assayed here the other day $892.42. Bull Run valley has already proven to be one of the best grazing and farming sections in the State. Mr. HUGHES, who has just returned from his ranch at the junction of Bull Run and Independence creeks, says the valley is rapidly settling up with good and substantial men, and early in the Spring a company will, at the mouth of Silver creek, erect a flouring mill. We have had a theatre in Mountain City at last. On Saturday evening there was a grand raffle at the hotel for a fine sewing machine. Early in the evening all the roughs, miners and crooked-hair gentry of the town assembled in the bar-room, each determined to win; but, as it should be, the winner was one who is likely to need it soon for home use. But now comes the funny piece. At the close, the disappointed "Hoosiers, Yankees, Webfeet and Missourians" engaged in a general row; bar tumblers, dice boxes, bad words and other missiles, flew thick and fast. Peace officers were called for, but "nary" an officer could be found. Next morning several parties could be seen looking around for false teeth, glasses from spectacle frames, and good names lost in the fracas. Our good people only wonder we have not had a sewing machine peddler and a theatre here before this time. Upon the whole, our section of country seems prosperous.

G. J.

The same paper contains the following items;

COPE DISTRICT.

The Excelsior Company has struck another rich chimney north of the old works on that ledge. As it was the first location made in the district, it may include several dips, spurs, angles, variations and offshoots. Harris and Loveridge continue to take the richest of ore from the Independent mine. They are running levels, etc., at a depth of 120 feet. HAYS, NIVER & Co., are running levels on the El Dorado at a depth of 75 feet. This ledge is fully five feet wide and very rich. The boys on the Ku-Klux are now down 50 feet on their ledge, which is four feet wide, and have $250 milling ore. The Monitor is being worked from its 60-foot level, and judging from the piles of rich ore, the owners are satisfied with themselves and the rest of mankind. The richest little thing is the Kanahwa, which consists of sulphuret and chloride of silver, with a trace of quartz. The proprietors have about 30 tons of rich mineral now out. The Norton mill is idle just now, waiting for shoes and other castings. Mine owners are beginning to growl at the delay, as rock can be reduced cheaper at this mill than elsewhere. The Davis mill is constantly employed on high grade ores, guaranteeing 80 per cent. on pulp assay, and charging $30 a ton for working, roasting, &c. Judge WATSON delivered an interesting lecture the other evening on the subject of temperance, which is highly spoken of by those who listened to his discourse.

BULL RUN DISTRICT.

From MARTIN DURFEE, one of the original locators of the celebrated Porter mine in this district, and who arrived in town a day or two since from the mines of Bull Run, we learn that Mr. HARTWELL, a capitalist from Philadelphia, operating for English capital, has purchased two of Governor CHILLIS' mines, the Monument and Found Treasure, and it is understood that the Governor pockets the snug sum of $32,000 for the same. Mr. HARTWELL will put a mill into Bull Run and have it in running order by the first of next January. The Silver Belt and Revenue mines are looking finely, The Revenue Company has 40 tons of chloride ore on its dump, that will work $100 a ton by wet process. The Revenue has a splendid ledge six feet in width. The Blue Jacket Company is working four men and taking out splendid ore. The Buster mine owned by MCDONALD & BOWMAN, is looking well. Three different parties of moneyed men have been at Bull Run within three weeks, and the mines please them better than they had any anticipation of.

From the Reese River *Reveille* of August 19.

GROSS YIELD OF ORES, ETC.—From the Report of the Assessor of this county to the United States Surveyor General, we take the following figures. Total number of tons of ore worked from mines located in Lander county, upon which the bullion tax has been collected as shown by the Assessor's books, from July 1st 1869, to July 1st 1871—29,488 tons. Gross yield of the same, $2,380,767 85. This of course does not include ores from districts situated in other counties, although worked here. Nor does it include low grade ore that is exempt from the bullion tax.

From the San Francisco *Alta* of August 20.

THE NEVADA MINES.—We gave, a day or two since, the production of ore in each of the leading Washoe mines since their origin, and the results were very flattering. Within the past year, however, the mines in what is called the base-metal region are more that rivaling the operations of the Comstock mines in the same period of their discovery. In the Ely District alone the operations have reached a monthly shipment of $400,000 or $5,000,000 per annum, bullion East by railroad, mostly to LEES & WALLER, New York, and those mines are but now showing their real resources. In April last there were 45 stamps in operation there, and the product was $171,000. There are now 65 stamps in operation, thus:

Meadow Valley Mill	30 stamps
Raymond & Ely	20 "
Chicago	10 "
Raymond	5 "
Total	65 stamps

Only from these stamps $400,000 per month is evolved and in increasing proportion, consequent upon recent discoveries of richer ore. The Meadow Valley mine began to turn out ore rapidly in August 1870. The Raymond & Ely was organized in January last, and the Pioche has but recently started. The yield of these mines has been as follows:

	Tons.	Value.
Meadow Valley	16,530	$1,612,900 52
Raymond & Ely	....	408,723 92
Pioche	300	54,000 00
Total		$2,075,644 24

That has been the product of three mines operating under great disadvantages, in a new region where mills and other facilities were to be gradually supplied. These difficulties are illustrated in the returns of the Meadow Valley mine for the year, showing the montly product of ore:

	No. Tons Worked	Bullion Product	Product Per Ton	—Cost pr ton— Min'g.	Milling.
August	1,161	$77,100	$66 41	$19 48	$16 47
Sept.	1,027	114,488	114 69	29 27	16 10
October	1,071	166,011	151 86	29 06	21 93
Novb'r	1,017	135,387	133 06	19 31	23 10
Decb'r	1,460	151,731	103 85	21 17	24 25
January	1,503	154,097	102 48	17 56	21 87
February	1,449	131,047	93 89	29 84	16 16
March	1,312	124,786	95 09	43 69	18 35
April	1,007	82,746	82 17	20 58	20 74
May	1,161	119,338	102 71	34 59	24 63
June	1,608	157,498	97 90	21 66	17 85
July	1,614	193,665	119 96	26 64	15 45
	15,395	$1,612,899	$105 34	$24 51	$19 60

These figures show the movement clearly; but it will be borne in mind that everything was to be provided, and the $1,612, 899 has been expended as follows:

Bullion Product	$1,675,699
Paid labor	$358,161 67
Paid freight	75,617 72
Paid running expenses	433,231 81
	826,011
Profit	$813,668
Purchase of properties	$289,558 17
Construction mine	44,803 53
Construction mills	214,066 32
Net dividends, cash	120,000 00
Net on hand	145,240 84
	$813,668

These figures show the large expenditures involved in opening the mine and equipping it with mills, etc. The mine has paid all these expenses and given its stockholders $120,000, and has $166,883 56 cash and bullion, on hand. The table of bullion receipts show how rapidly the production has increased. This increased production is common both to the Raymond & Ely and Meadow Valley. In June, discoveries of ore of a very rich and very friable nature were made in both mines that can be worked at greatly reduced expense. That in the Raymond & Ely is particularly valuable. The product of July was $90,000, and up to this date in August it is already $45,000, enabling the company to pay full dividends and to increase them for the next month. The body of ore in sight will give dividends for many months to an amount equal to the present value of the stock. The mines are now well supplied with mills and material, and the production goes on at a small rate of expense. The neighboring district, the Eureka—also gives great results. The Eureka Consolidated has raised since July 7, 1870, as follows:

Bullion tons	2,985 95
Bullion, value, $400 per ton	$1,094,400

This bullion is mostly shipped by rail to this city, and thence by the Isthmus to Newark, N. J., where it is reduced and drawn against. The other mines in that region are also improving. Thus, in those two new regions of Nevada alone about $7,000,000, per annum has been added to the minig resources and drawn against on New York for San Francisco account. That large revenue, added to the sales of mines in London, in which San Francisco has an interest, points out one of the leading causes of the supply of money. Within the past week a Utah silver mine was bought by European capitalists for $750,000, and the transaction was closed by telegram on the 8th of August. The present prospect is, with the increased production of Washoe, the other regions of Nevada, and the out-turn of the Utah mines, that the flow of metals will be greater than ever this year and the next.

Idaho.

The Owyhee *Avalanche* of August 12th, has the following.

The mining prospect continues to be most encouraging. Some two or three enterprises are now under way which, if satisfactorily arranged, will afford employment to many more men than are now out of work in the camp....Last Tuesday a four-foot ledge was struck at the bottom of the 7th level, south of the shaft in the Chariot. The new strike is said to be rich which would seem to be the fact from the appearance of the ore on the yard....The Mahogany is yielding a splendid quality of ore, and as soon as a crushing can be made, handsome returns may be looked for....The new wire hoisting rope for the South Chariot (PECK & PORTER) has arrived, so that work can now go on without interruption. A contract was let this week to sink the main shaft 100 feet deeper, at $17 80 per foot—thought by experienced miners to be a cheap figure....There are now between 30 and 40 men at work in the Oro Fino which is yielding good looking ore. The Oro Fino is a large vein—from four to seven feet wide—and can supply all the mills in camp with ore if it will pay for working....The Ida Elmore Company have elected a new Board of Trustees who, it is said, will immediately resume operations on the mine....It is reported that arrangements have been made to incorporate the Skookum which is one of the best mines in Camp ....The south shaft of the Idlewild is down 38 feet. The pay streak is only some two or three inches in width, but is exceedingly rich in gold....The Empire looks better than ever. MICKEY & Co., who possess a lease of the mine for a year, have a good thing.....The parties at work on the Morning Star got the water out of the mine last Monday and are getting ready to take out ore ....Splendid looking ore continues to be taken from the Noonday....SANDS & Co., will resume operations on the Illinois Central before long....W. B. KNOTT is working his mine on Florida mountain and has from 25 to 30 tons of ore ready for crushing. It is very rich in gold, and good judges estimate that it will yield from $200 to $250 per ton....Placer mining has been suspended for the season, except in the creek where it will continue till

winter sets in. The owners of hill and gulch diggings are digging ditches, building flumes, &c., to be in readiness for operations next spring.

Arizona.

THE VULTURE MINE.

From the Arizona *Citizen* of August 5: The mine was discovered by WICKENBURG—now running a ranch near town. The road leads over hard ground and an easy divide to the mines, from where it looks like a dead level south to the Gila—thirty-five miles. The company claim 900 feet of the ledge, but confine their developments to 300 of that distance; also the exact depth now reached. This depth is in the the eastern chimney, so-called; the western shaft and incline is down 170 feet. I say incline, for neither depth is reached vertically. The ledge at these works is thought to have broken over to the south, hence the great apparent width on the surface. General direction of discovery and tracing, north and south. The deposit is worked to a width of at least 100 feet on the surface, and the ore to the present depth is generally all of half that width, and dipping into the hill east. What surprised me, if anything, was the vastness of the prospect. The good character of the property is evidently quite thoroughly established. There is so much blowing about contemptible holes in the ground, in a thousand districts on "this coast" that I feel thankful for a look at something of the kind in the question. If the Vulture is not a "true fissure vein," it possesses the evidences to that end at present depth as largely as did the Washoe Chief. The latter predominated in silver—this in free gold ore throughout. The Comstock claims consume forests of timber for propping-up purposes, while the Vulture has been started and is yet managed so as to require little or no bracing, except as afforded by the natural pillars of quartz -which in their turn must give way to "dead"-rock filling. To be sure, there is no water in the Vulture (a misfortune), but mines without water can be often managed without a city of timber below the surface. All the houses about the Vulture are built of $10 ore, and there are at least twenty-five thousand tons of that grade lying round loose; beside $6 per ton said to remain in the tailings below the mill—all of which, to say nothing of the rapid accumulation going on, will be of great value alone at no distant day. Mr. TAYLOR, who built a narrow gauge road in England many years ago, and which is yet running, thinks the Gila river the proper destination for Vulture reduction; and that a couple of mules or other donkey engines could do the work of the present costly and tedious arrangement. Here is $8 per ton for hauling ore; the same for wood per cord, and forty barrels of water per day must be hauled for use on the road or at the mine. The day I was at the bottom of the shaft, a healthy-looking seep of water was struck for the first time in the history of the concern, and I am now told that the Superintendent there is of opinion that he has finally reached what miners know as "the water level"—an event of importance to them. He thinks considerable water near at hand, and enough for blasting purposes would be a great saving and convenience. Am also told that a considerable body of richer ore than usual was found on that level since my visit. The average quantity of milling ore extracted and reduced every twenty four hours is about sixty-five tons; the total cost of getting out the metal for market is about $15. Just what profit is obtained, is quite another thing, and I have made very general inquiries on that point. A clear profit of but $2 50 per ton would constitute a handsome income. How much above that grade the ore averages, I will not say. What is the more interesting feature of the whole affair, is to know that quartz is reduced now in California where the entire proceeds of the ore amounts to but $2 50 per ton. It seems impossible that 49 prices for materials and facilities will be maintained in this Territory above a very few years more, when my expectations are that Arizona will be one of the most prosperous mining sections in the Union. Labor is now cheap enough in proportion in this Territory, and I would advise no more poor men to emigrate here before Bradshaw is prospected, only as money can do it, ere the Indians are quieted. Several months more will tell much better regarding the future of that district, if the work be conducted on the square—and I think it will be, so far as that word as yet applies to mining "operations." It is distressing to know that what is destined to be one of the foremost industries of the nation—mining for the precious metals in quartz—is spoken of as you would refer to the operations of a den of thieves or counterfeiters; and always treated in the light of gambling. In Arizona timber is more evenly distributed than in any the older mining States or Territories; there is more water than the country gets credit for on the surface, and when needed, much can be readily obtained by a small outlay in digging; pasturage is generally superior in quantity and quality; but above all, to my ways of thinking, the climate will be found very acceptable to thousands now anxious for the Indian question to be settled before prospecting it themselves with a view to permanent settlement in one or another capacity. And from what I intimately know of GENERAL CROOK'S scouting system elsewhere—if he gets it to working here as of old, and is let alone about two winters, there will be the sickest lot of savages remaining that ever was known on the continent. By the way, there is little skepticism on that score through the northern settlements, and I have taken some interest in sounding them thereon.

CIVIL AND MECHANICAL ENGINEERING,

At the Rensselaer Polytechnic Institute, Troy, N. Y. A higher and more practical Course of Instruction will be given here than has ever been attempted elsewhere in this country. Re-opens Sept. 13th. For the Annual Register, containing improved Course of Study, and full particulars, apply to

Prof. CHARLES DROWNE, Director.

THE MORRIS COUNTY

Machine and Iron Company,

DOVER, NEW JERSEY,

MANUFACTURERS of STEAM ENGINES, BOILERS, and all kinds of machinery. Special attention given to MINING MACHINERY, REPAIR WORK and PERFECTING NEW MACHINERY. IRON and BRASS CASTINGS, at low prices. PORTABLE and other HOISTING ENGINES and MACHINERY. au22-3mos

WOOLEN MILL FOR SALE.—HALF INTEREST in a First Class Mill. Trade and reputation established. Four years old. Complete in its appointments. Has made money constantly and doing so now.

Satisfactory reasons for the sale.

Good references given and required.

The whole or half will be sold. Practical Manufacturer preferred. Address Box 249, Lewistown, Illinois.

W. G. ATKINSON,

CIVIL AND MINING ENGINEER,

Limestone Springs, Spartanburgh Co. S. C.

Attention paid to ENGINEERING SURVEYS, EXPLORATIONS, &c., and to PLANS and CONSTRUCTION of WORKS in the COAL and IRON FIELDS of the SOUTHERN and WESTERN STATES.

REFERENCES—Gen. Geo. S. Greene, late Chief Eng'r "Croton Aqueduct," N. Y. City; Hon. P. C. Wright, 59 Liberty street, N. Y.; J. Edw'd Bering, Eg'r and Sup't "Sterling Iron Co.," 42 Pine street, N. Y.; Dr. Edward Foreman, "Smithsonian Institute," Washington, D. C.; Henry Blackstone, Chief Eng'r, Pittsburgh; Rob't Cravens, Iron Master, Chattanooga, etc., etc., etc.

P. H. VAN DER WEYDE, M. D.,

(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)

Analytical & Consulting Chemist and Engineer.

837 Pacific avenue, above Grand avenue, Brooklyn.

Office ENGINEERING AND MINING JOURNAL, 37 Park Row, New York City. 30tf'an

THEODORE ALLEN,

ENGINEER,

No. 45 William street, New York.

Designs and Specifications prepared for all kinds of Iron Ships and Steam Machinery. Construction and Repairs superintended. Experiments conducted. Advice given, etc. All kinds of Machinery furnished at Manufacturers' prices. feb8-td

STANDARD CLAY RETORTS,

FIRE BRICKS AND TILES,

STOVE LININGS AND FIRE CEMENTS.

Vitrified steam-pressed Drain and Sewer Pipe, and Manufacturers of Clay in general.

Baltimore Retort and Fire-Brick Works.

GEO. C. HICKS & CO,

Apr4:eow:1y Baltimore, Md.

BIDWELL'S COAL OIL AXLE GREASE.

THE BEST IN THE MARKET.

USED BY

RAILROAD MANUFACTURING COMPANIES,

ROLLING MILLS, AND UPON VEHICLES OF ALL KINDS.

SEND FOR CIRCULAR AND PRICE LIST.

DANIEL BIDWELL, MANUFACTURER.

254 PEARL STREET,

ja:28:6mos NEW YORK

AGENTS AND CANVASSERS WANTED.

IN EVERY CITY AND TOWN IN THE UNITED STATES.

FOR THE

Engineering and Mining Journal.

Liberal inducements. Specimens sent free. Address,

37 Park Row, New York.

WILLARD P. WARD, Manager

COAL SHIPPERS.

WHITE, FOWLER & SNOW.

Wilkesbarre and Lehigh Coal,

FOR STEAM AND FAMILY USE.

OFFICE:

Room No. 49, 111 BROADWAY, (Trinity Building).

JNO. WHITE,
LINDLEY H. FOWLER,
LOUIS T. SNOW.

jan1-1y

THE NEWBURGH ORREL COAL COMPANY.

Mines at Newburgh, Preston Co., W. Va.

Company's Office, No. 52 S. Gay St. Baltimore, Md.

C. OLIVER O'DONNELL.....President.
CHAS. MACKALL.....Secretary

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with alarge amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., theBaltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. sep21-1y

WILKESBARRE COAL, DELIVERED DIRECT from the Mines of

The Wilkesbarre Coal and Iron Co.,

or for re-shipment at

HOBOKEN AND JERSEY CITY.

OFFICE:

ap1-1y 80 Broadway, New York.

THE DESPARD COAL COMPANY OFFER THEIR Superior DESPARD COAL to Gas Light Companies throughout the country.

MINES IN HARRISON COUNTY, West Virginia.

Wharves, Locust Point,
Company's Office, No. 29 South st. } Baltimore.

AGENTS:

PARMELEE BROTHERS, No. 32 Pine street, New York. BANGS & HORTON, No. 31 Doane street, Boston.

Among the consumers of Despard Coal we name Manhattan Gas Light Co., New York; Metropolitan Gas Light Co., New York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C. Portland Gas Light Co., Portland, Maine.

☞ Reference to them is requested. may30-1y

LEWIS AUDENRIED & CO., MINERS AND SHIPpers of the following celebrated

ANTHRACITE COALS.

From Philadelphia and the Mines,

DIAMOND, Red Ash; SPOHN, Red Ash; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash; Old Company's Lehigh; Wilkesbarre.

From Port Johnston and Jersey City,

Old Co.'s Lehigh, Hazleton, Wilkesbarre, and Shenandoah Coals.

Also the superior CUMBERLAND COALS.

BROAD TOP,	BARTON,	BARTON,
SEMI-BITUMINOUS,	GEORGES CREEK,	GEORGES CREEK,
at Philadelphia.	at Baltimore.	at Alexandria.

205 Walnut street, Philadelphia; 14 Kilby street, Boston, 34 Westminster st., Providence; 24 Second st., Baltimore,

110 BROADWAY, NEW YORK. Jan3.1y

COXE BRO.'S & CO., CROSS CREEK COLLIERY, MINers and Shippers of the Celebrated

Cross Creek Free Burning Lehigh Red Ash

COAL.

FROM THE BUCK MOUNTAIN VEIN.

OFFICES;

Philadelphia, No. 341 Walnut street.
Drifton, Jeddo P. O., Luzerne Co., Pa.

Agent in New York, SAMUEL BONNELL, Jr.,
Room 43, Trinity Building,
feb-1 111 Broadway.

G. B. LINDERMAN & CO.,

MINERS,

Sugar Loaf, Lehigh Coal.

OFFICE, 50 TRINITY BUILDING, 111 BROADWAY
may23-1y NEW YORK.

SAMUEL BONNELL, JR., OFFERS FOR SALE HIS SUGAR CREEK and HONEY BROOK

LEHIGH COALS,

OFFICE:

43 and 45 TRINITY BUILDING, 111 BROADWAY,

NEW YORK. Jan:1y

RANDOLPH BROTHERS,

SOLE AGENTS OF THE ORIGINAL

Spring Mountain Lehigh Coal.

EXTENSIVELY USED FOR SMELTING IRON.

☞ Rooms, 28 and 30 Trinity Building,

Ap6tf NEW YORK.

Advertisements.

The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is doubly valuable as a permanent means of keeping an advertisement before the public. It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country, and presents the very best means of reaching that very important class of men.*

Rates of Advertising.

The rates of advertising, compared with those of other weekly industrial publications, are very low, especially when the class of consumers among which its large circulation is almost entirely confined, is taken into consideration.

Back Page ..... 40 cents a line.
Inside Pages ..... 35 cents a line.

Engravings may head advertisements at the same rate per line, by measurement, as the letter-press.

MISCELLANEOUS.

THE CHALMERS-SPENCE PATENT NON-CONDUCTOR CO.

HEAD OFFICE: MORGAN IRON WORKS, NEW YORK.
ST. LOUIS BRANCH,
1202 & 1204 N. Second street.

Never deteriorates. Saves 20 per cent. Keeps steam perfectly dry. Thirty of the largest Mississippi boats have their boilers, pipes, etc., covered with this invaluable material.

J. CHALMERS, Manager.
J. B. ROACH, Treasurer.
71

The Engineering AND MINING JOURNAL

In addition to the many attractive, interesting and valuable features already associated with this Journal as a

Technical and Professional Organ,

the Editors have determined to incorporate into its columns a

Department of Popular Science,

containing readable articles on the latest results of scientific inquiry in every realm of knowledge. This department is

Added to the usual Reading Matter,

since the space for it is obtained by omitting the weekly lists of the U. S. Patent Office, now no longer required by our business.

ENGINEERING AND MINING JOURNAL,

BUY A COPY; READ THE DEPARTMENT OF POPULAR SCIENCE: SEE THE

GENERAL EXCELLENCE

OF THE PAPER, AND SEND YOUR SUBSCRIPTIONS TO

WILLARD P. WARD, Manager,
P. O. Box 4404. *37 Park Row.*

J. THOULET & C. RASCHER, MINING AND CIVIL Engineers, Maps, Topographical and Mining Surveys, Superintendence of Mines, Metallurgical and Chemical Works, Examinations and Reports on Coal and Metallic Mines, Assays, etc., Oriental building, 122 La Salle street, Chicago.

WOOD ENGRAVING

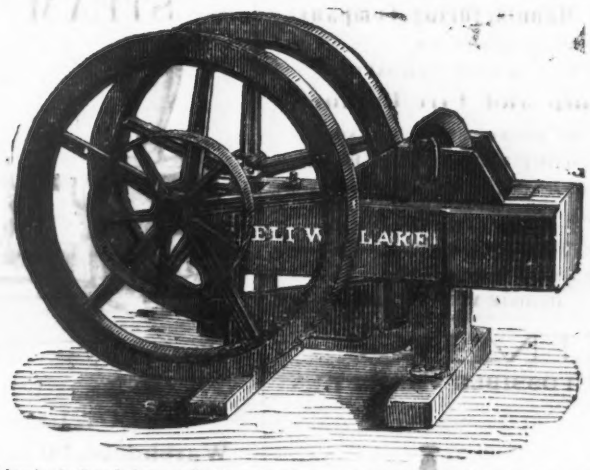
EXECUTED AT THE OFFICE OF

The Engineering and Mining Journal
No. 37 PARK ROW, NEW YORK CITY.

MICROSCOPES FOR SCIENTIFIC INVESTIGATIONS and Educational Purposes. Price list sent free. T. H. McALLISTER, Optician,
c21-6m 49 Nassau street, N. Y.

MISCELLANEOUS.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

JOHN A. GRISWOLD, ERASTUS CORNING,
ERASTUS CORNING, JR., CHESTER GRISWOLD.

JOHN A. GRISWOLD & CO.,

PROPRIETORS OF THE

RENSSELAER IRON WORKS,

TROY, N. Y.

Bessemer Steel Works, Fort Edward Blast Furnace and Columbia Blast Furnace

MANUFACTURERS OF PIG IRON, RAILROAD, MERCHANT AND SHIP IRON,

Bessemer Steel Rails, Axles, Tyres, Shafting Plates and Steel Forgings,

OF ALL DESCRIPTIONS.

Office in New York, No. 56 Broadway.

May 17:1y

LEHIGH ZINC COMPANY.

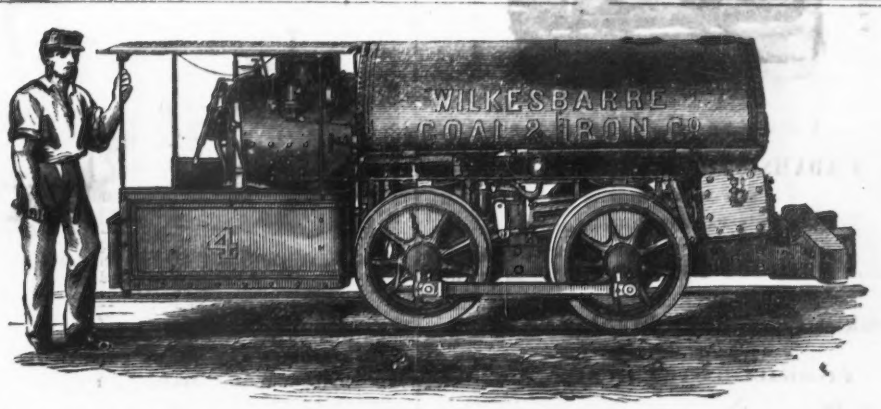
GORDON MONGES, Treasurer. B. C. WEBSTER, President

WORKS, BETHLEHEM, PA. OFFICE, 333 Walnut Street, Philadelphia.

JOHN JEWETT & SONS, AGENTS, 182 FRONT STREET, NEW YORK.

OXIDE OF ZINC, SPELTER, SHEET ZINC.

Jun28:1y **SPIEGELEISEN CINDER FOR BLAST FURNACES.**



IMPROVED DIRECT-ACTING MINING LOCOMOTIVE.

Gauge, two feet six inches or upwards; Hight above rail, five feet four inches; Width over all, five feet one inch; Adapted to burn Anthracite or Bituminous coal or coke.

Materials and Workmanship Equal to those in Full Gauge Railroad Locomotives.

Guaranteed to pass curves of twenty-five feet radius and haul on a level track in good condition

Three Hundred and Forty Gross Tons of Cars and Load.

For Photograph and full particulars, address

M. BAIRD & CO.,
Baldwin Locomotive Works, Philadelphia.

Feb:7:1y:eow

STEAM PUMPS.

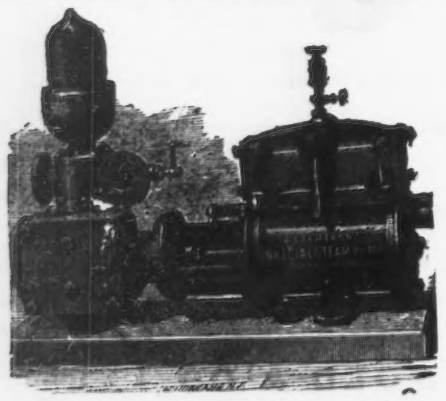
THE WOODWARD
Steam Pump Manufacturing Company,
MANUFACTURERS OF THE
WOODWARD PATENT IMPROVED SAFETY
Steam Pump and Fire Engine.
STEAM, WATER, AND GAS FITTINGS OF ALL KINDS.

Also dealers in WROUGHT IRON PIPE, BOILER TUBES, etc. Hotels, Churches, Factories, and Public Buildings, heated by Steam, Low Pressure.

Woodward Building, 76 and 78 Centre street, corner Worth street, New York. Formerly 77 Beekman street.

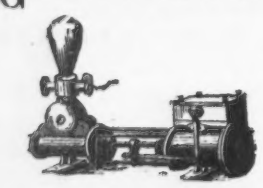
mar 14-1y GEORGE M. WOODWARD, Pres't.

PUMPS
IN EVERY POSSIBLE VARIETY.



A. S. CAMERON & CO.,
FOOT 23d STREET, E. R.,
oct18:1y NEW YORK.

GUILD & GARRISON, MANUFACTURERS OF



Steam Pumps,
Vacuum Pumps
Steam Engines
Vacuum Pans,
And all the various connections. For sale at the STEAM PUMP WORKS, 26, 28 and 30 First street, Williamsburgh, N. Y.
sep14-6m

Niagara Steam Pump Works.

FIRST PREMIUM

AMERICAN INSTITUTE, 1871.

CHARLES B. HARDICK,
No. 9 ADAMS STREET, BROOKLYN, N. Y.,
Sole Manufacturer of
HARDICK'S PATENT DOUBLE-ACTING
M PUMPS AND FIRE ENGINES,
Patented in England, Belgium and France. Send for circular.
feb-13-1y

Fishkill Landing Machine Works,
Established 1853.
FISHKILL-ON-THE-HUDSON, N. Y.

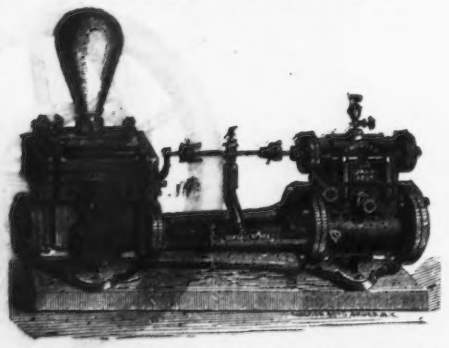
STEAM ENGINES,

Iron and Brass Castings, Forgings, Boilers and Machinery.

Sole Manufacturers of the celebrated LOOMIS STEAM ENGINE, with Patent Variable Cut-off by the Governor.
Jobbing and Repairs promptly attended to.
JAS. L. TELLER, Secretary. MILO SAGE, President.
sept13:1y

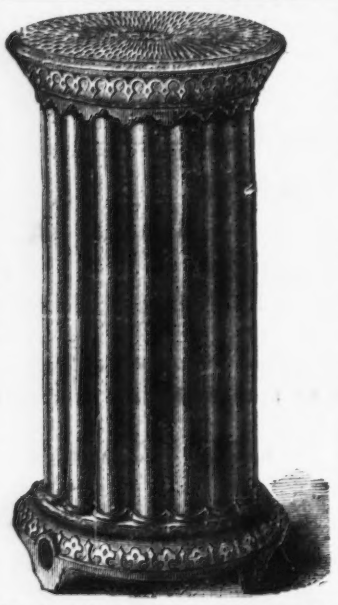
MISCELLANEOUS.

KNOWLES'
STEAM PUMPS.



PUMPS GUARANTEED FOR EVERY SITUATION.
KNOWLES & SIBLEY,
Warehouse. 90 and 92 Liberty st.,
NEW YORK.
Works at Warren, Mass.
ap:18:3mos

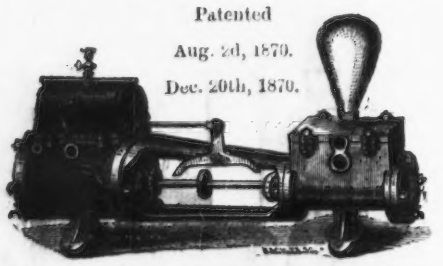
JOSEPH NASON'S VERTICAL TUBE RADIATORS,



IN VARIOUS SIZES AND PATTERNS.

JOSEPH NASON & CO., 61 BEEKMAN ST., corner of Gold street.—WROUGHT and CAST-IRON PIPES; all kinds of STEAM and GAS FITTINGS; Apparatus for WARMING and VENTILATING BUILDINGS.
JOSEPH NASON. HENRY R. WORTHINGTON.
my29-6m

THE SELDEN DIRECT-ACTING
STEAM PUMP,
A. CARR, Manufacturer.
Patented
Aug. 2d, 1870.
Dec. 20th, 1870.



Combining simplicity and durability to a remarkable degree. Its parts are easy of access, and it is adapted to ALL PURPOSES or which Steam Pumps are used.
AS A MINING PUMP
It is unsurpassed. Also,
Steam, Gas and Water Pipe Brass Work.
Steam and Water Gauges, Fittings, etc., etc
Send for Price-List and Circulars.
Address A. CARR,
43 Courtlandt Street, New York.

$25. STEAM JET PUMP. $25.

The simplest and cheapest device ever known for raising water, oils, syrups, acids, &c. Capacity 40 gallons per minute. Used in hotels, factories, mines, quarries, &c. Operated by steam direct from boiler. *Has no valve or wearing parts of any kind. Is unaffected by sand or grit.* Certain to work at all times. Sent to any address on receipt of $25. SINKER, DAVIS & CO., Indianapolis, Ind,

MISCELLANEOUS.

E. B. BENJAMIN,
10 Barclay Street,
IMPORTER OF
CHEMISTS AND ASSAYERS' UTENSILS,
In every variety.
Assay Balances,
Furnaces,
Chemicals,
Blow Pipe Sets,
In cases and details.
Crucibles, Cupels, etc.
Also, a very large stock of choice and rare chemicals, and glassware for use in laboratories. may23

DUNCAN, SHERMAN & CO.,
BANKERS,
CORNER OF PINE AND NASSAU STREETS,
NEW YORK.
ISSUE CIRCULAR NOTES AND LETTERS OF CREDIT FOR TRAVELERS, AVAILABLE IN ALL THE PRINCIPAL CITIES IN THE WORLD.

TRANSFERS OF MONEY TO EUROPE AND THE PACIFIC COAST BY TELEGRAPH.
☞ Interest allowed on Deposits. feb-1v

EVERY USER OF STEAM POWER SHOULD HAVE
BELLIS' PATENT GOVERNOR,
It is the **CHEAPEST** and **BEST** Regulator for Steam Engines, known to mechanics.
We offer **SPECIAL INDUCEMENTS** to Engine Builders. ☞ Address for Circular and Price List, SINKER, DAVIS & CO., Indianapolis, Ind.
jly.25;3.mo:

ADOLPH OTT,
CHEMICAL ENGINEER,
May be employed professionally as an expert on practical subjects, involving both Chemical and Mechanical knowledge. A specialist in various branches of Technology. Assays and Analyses of all kinds. Address, Editorial Rooms of the "Engineering and Mining Journal," 37 Park Row, New York City.
☞ Written communications preferred. nov28-tf

THE ENGINEERING
AND
MINING JOURNAL,

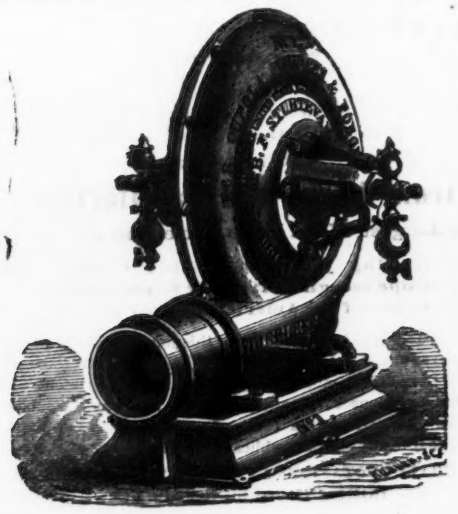
A weekly periodical containing all the news of special interest to
CIVIL & MINING ENGINEERS,
as well as many descriptions and illustrations of NEW MACHINERY for
MECHANICAL ENGINEERS.
The full and accurate weekly reports of the Mining and Transportation Companies engaged in
THE COAL TRADE
give it a FINANCIAL VALUE which has gained for it an extensive circulation among Manufacturers and all Coal Dealers and buyers in the country. An excellent
ADVERTISING MEDIUM
or the branches to which it is specially devoted, as it reaches the SUPERINTENDENTS, PROPRIETORS and ENGINEERS.
Price $4 per Annum.
Specimen copies free. Address
WILLARD P. WARD,
P. O. Box 4404. Manager.
No. 37 PARK ROW, NEW YORK.

WILLIAM F. McNAMARA,
SOLICITOR OF PATENTS
AND COUNSELLOR-AT-LAW,
No. 37 PARK ROW, NEW YORK, ROOM 22.
Advice in Patent Law given free. mar 8:tf

MAGIC LANTERNS FOR SUNDAY SCHOOLS, Academies, Public Exhibitions, and Parlor Entertainments. Illustrated priced catalogues sent free.
T. H. McALLISTER, Optician,
Dec.21:6m 49 Nassau street, N. Y.

E. F. DUNNE,
Attorney and Counsellor at Law,
1301 F STREET, WASHINGTON, D. C.,
PACIFIC COAST.—Will practice in all the Federal Courts.
Specialty in Patents for Lands Mines and Town-Sites.
mar15-1y

MACHINISTS' SUPPLIES.



B. F. STURTEVANT'S
PATENT IMPROVED
PRESSURE BLOWER,
FOR CUPOLA FURNACES AND FORGES.

Also manufacturer of the Sturtevant Patent Improved Fan Blower and Exhaust Fan. Send for illustrated catalogue.
B. F. STURTEVANT, 72 Sudbury street, Boston, Mass.
n29:1y

E. LYON,
MANUFACTURER OF
Patent Portable Hydraulic Jacks
and Punches.
470 GRAND STREET, NEW YORK

For Raising heavy Weights, such as Locomotives Boilers, Guns, Heavy Machinery, Wrecking Purposes, putting together Water and Gas Pipes, pushing off Cranks and Propellers, Pulling, Proving Chains and Ropes, setting up Rigging, or Pulling Stumps, Punching and Shearing Iron, Die-Sinking, etc.

☞ IMPROVED PATENT HYDRAULIC JACKS, that run out their entire length in a HORIZONTAL or any other position.

PATENT HYDRAULIC PUNCH,
For Punching Iron, Die-Sinking, etc. Ap 12;1y

KROM'S PATENT DRY ORE CONCENTRATOR
AND COMPLETE MACHINERY
FOR CRUSHING SCREENING
AND CONCENTRATING ORES.

Minerals and Ores in which the difference of specific gravity is so slight and which are also sometimes in such fine particles as to defy separation by any other machinery or method, are readily separated by this Concentrator.

Mr. W. Bement, of Georgetown, Col., concentrating Silver ores, says: "I am satisfied your machines can not be beaten; they are simple, require no power (comparatively,) and do not get out of order."

Parties interested in mining are invited to call at No. 210 Eldridge street, New York, where they may see a machine in operation and have samples of their own ores crushed and concentrated.

For information and circulars, apply to
S. R. KROM,
No. 210 Eldridge street, New York City.

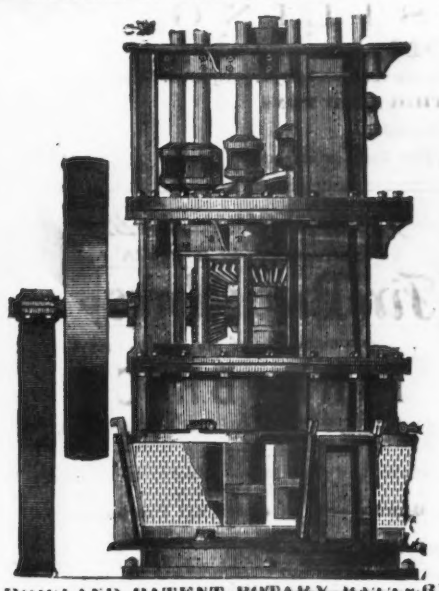
R. P. ROTHWELL,
MINING AND CIVIL ENGINEER
AND METALLURGIST,

From the Imperial School of Mines, Paris, member of the Geological Society of France, etc.
OFFICE, WILKESBARRE, PA.

Having had a large practical experience in Europe and this country, is prepared to examine and report on all kinds of mineral property, superintend mines, and metallurgical works, assay ores, etc. 18-2-qp

MINING MACHINERY, ETC.

MINING MACHINERY OF ALL KINDS. MANUFACTURED BY MOREY & SPERRY.



HOWLAND PATENT ROTARY BATTERY

of 12 stamps. It requires no frame to put it up. Guaranteed to crush 2½ to 3 tons per day to the stamp. The best Battery ever used for amalgamating gold, or crushing silver ores, dry or wet. Can be put up on a mine in running order for one-half the price of the straight battery, and in three days after its arrival at the mine. 12-stamp battery, 20,000 pounds, with frame complete; 6-stamp battery, 7,000 pounds. Every mill run at shop before shipping.

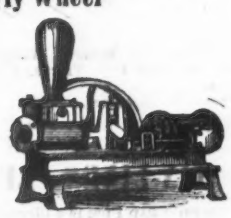
CALIFORNIA STAMP MILLS,

All the various styles of Pans, Amalgamators, Rock Breakers, Separators, Settlers. Concentrators, Dry or Wet, for working Gold, Silver or Copper Ores, the same as built in California and at lower prices. SHOES AND DIES made of the best white iron. Send sizes and we will make patterns and forward Shoes and Dies at low prices. Engines, Boilers and fixtures, and other Machinery made to order. Also, Howland's Patent Rotary Valve Double or Single Engines.

Irons for the best California stamp mill, straight battery, complete. Also, Irons for low mortar, old style mill, and all other kinds.

☞ Send for a Circular.
Address MOREY & SPERRY,
Jan 10:y 95 Liberty Street New-York.

J. CLAYTON'S
Patent Fly Wheel
STEAM PUMP,
AND
STEAM ENGINE
COMBINED.



These pumps are the cheapest first-class pumps in the market.

All sizes made to order at short notice.

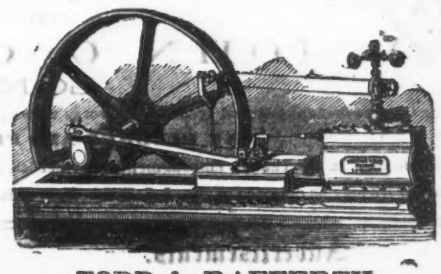
JAMES CLAYTON, 24 & 26 Water st,
Nov18-tf Brooklyn, N. Y.
Office: 50 & 52 John street, New York.

DIAMONDS AND CARBON furnished and set for drilling rock, sawing or working stone, also *Glazier's Diamonds*. See ENGINEERING AND MINING JOURNAL, January 17, 1871, for further particulars.
Address: JOHN DICKINSON, 64 Nassau st., N. Y.
febt4-3mo

H. A. ROGERS & CO.,
Successors to
JOHN ASHCROFT, and WALTON & CO.,
Railway, Machinists' and Engineers' SUPPLIES,
50 and 52 JOHN STREET,
Manufacturers of the Syphon Mercury Gauges.
Sole Agents for ASHCROFT'S STEAM GAUGE.
Also Agents for LINDSAY WRENCHES, STURTEVANT BLOWERS, JUDSON GOVERNORS.
Manufacturers of STEAM and WATER GAUGES.
Importers and Sole Agents for the United States for SCOTCH GAUGE GLASSES.

Steam Gauges Repaired.
j31y

ENGINES, IRON WORK, ETC.



TODD & RAFFERTY
GENERAL
MACHINERY MERCHANTS, ENGINEERS, AND MACHINISTS,

Manufacturers of Stationary and Portable Steam Engines and Boilers; also Flax, Hemp, Tow, Oakum, and
ROPE MACHINERY,
MILL GEARING,
SHAFTING.
Lathes, Planers, Drills, Chucks, etc. Iron and Brass Castings. Judson & Snow's Patent Governors constantly on hand
OFFICE AND WAREROOMS, 10 BARCLAY STREET, N.Y.
Office and Works, Paterson, New Jersey.
JOSEPH C. TODD oct-27-tf. PHILIP RAFFERTY

COOPER'S GLUE AND REFINED GELATINE

COOPER HEWITT, & CO.,
NO. 17 BURLING SLIP, NEW YORK.
Bar Iron, Braziers' Rods, Wire Rods, Rivet and Machinery Iron, Iron and Steel,
Wire of all Kinds, Copperas, &c., &c.
RAILROAD IRON, COOPER WROUGHT IRON BEAMS AND GIRDERS,
Martin Cast-Steel, Gun-Barrel and Component Iron,
PUDDLED AND REFINED CHARCOAL BLOOMS,
Ringwood Anthracite and Charcoal Pig Iron.
Works at Trenton and Ringwood, N. J.
May 17:1y

ALBERT BRIDGES,
MANUFACTURER AND DEALER IN
Railway and Mining Supplies and Mach'nery.

Hot and Cold Punched Nuts, Bolts, Lag Screws and Washers.

Belting, Packing, Hose, Rubber Springs, Car Trimmings, Steam Pumps.

Ball's Patent Telescope Jack.
NO. 46 CORTLANDT STREET,
P. O. Box, 2843. NEW YORK
Aug 31-1y

Four First Premiums, American Institute, 1870.
THE ALLEN ENGINE WORKS,
Fourth Av. and 130th and 131st Streets,
New York City.
MANUFACTURERS OF
THE ALLEN ENGINE
PORTER'S GOVERNOR,
The Allen Boiler, and
STANDARD STRAIGHT-EDGES,
Surface-Plates, and Angle-Plates.
Four First Premiums awarded at the Fair of the America Institute, 1870.
Send for an Illustrated Circular. dec1-1y

TRADE MARK.

PORTLAND CEMENT,

MANUFACTURED BY

JOHN C. GOSTLING

LONDON.

TRADE MARK.

This Cement is manufactured specially for works where great Strength and Durability are required. Upwards of

ONE HUNDRED AND FIFTY THOUSAND TONS

having been used in the Thames Embankment and other large works in London.

Particulars may be obtained of Mr. J. J. WILSON, 8 Cedar street, New York, or as above. au8-tf

Advertisements.

Advertisements admitted on this page at the rate of 40 cents per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

SCHOOL OF MINES, COLUMBIA COLLEGE.

FACULTY.—F. A. P. BARNARD, S.T.D., LL.D., PRESIDENT; T. EGLESTON, Jr., E. M., Mineralogy and Metallurgy; F. L. VINTON, E. M., Civil and Mining Engineer; C. F. CHANDLER, PH. D., Analytical and Applied Chemistry; JOHN TORREY, M.D., LL.D., Botany; C. A. JOY, PH. D., General Chemistry; W. G. PECK, LL.D., Mechanics; J. H. VAN AMRINGE, A.M., Mathematics; O. N. ROOD, A.M., Physics; J. S. NEWBERRY, M.D. LL.D., Geology and Paleontology. Regular courses in Civil and Mining Engineering; Metallurgy; Geology and Natural History; Analytical and Applied Chemistry. Special students received for any of the branches taught. Particular attention paid to Assaying. For further information and catalogues, apply to

DR. C. F. CHANDLER,
Dean of the Faculty.

nov21-1y-is

NEW YORK BELTING AND PACKING COMPANY. The oldest and largest manufacturers in the United States of

Vulcanized Rubber Fabrics,

Adapted to Mechanical Purposes,

invite the attention of all who are interested in the sale or use of such articles to the high standard quality and low prices of their various manufactures, comprising

Machine Belting, Steam Packing, Leading Hose, Suction Hose, Car Springs, Wagon Springs, Billiard Cushions, Grain Drill Tubes, etc., etc., etc.,

"TEST" HOSE

made expressly for the use of Steam Fire Engines, and will stand a pressure of 400 pounds per square inch. Officers of Fire Departments requiring new hose, will find this much superior in strength and quality to any other.

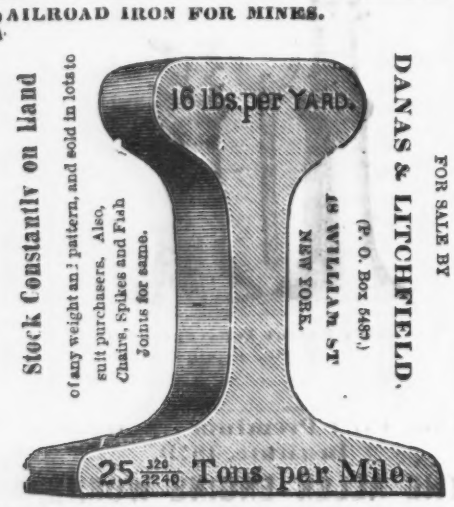
PATENT SOLID EMERY VULCANITE WHEELS, a composition of rubber and emery, making a very hard uniform substance of the nature of stone throughout. These wheels for grinding and polishing metals, "gumming" saws, etc., are the most economical and effective tools that can be used.

WAREHOUSE, 37 AND 38 PARK ROW, NEW YORK.
JOHN H. CHEEVER, Treasurer.

☞Price lists and further information may be obtained by mail or otherwise on application.

oct30-1y os

RAILROAD IRON FOR MINES.


16 lbs. per YARD.
25 328/2240 Tons per Mile.
Stock Constantly on Hand
of any weight and pattern, and sold in lots to suit purchasers. Also, Chairs, Spikes and Fish Joints for same.
DANAS & LITCHFIELD.
FOR SALE BY
45 WILLIAM ST. NEW YORK.
(P. O. Box 5823)

Light Locomotives, for use in Collieries, Mines, etc.

mch1-6m

LAFLIN & RAND,

POWDER CO., 21 Park Row, opposite Astor House, New York,

invite attention to their facilities for delivering

BLASTING POWDER,

SAFETY FUSE,

ELECTRICAL BLASTING APPARATUS, &c.,

wherever required, from having nine manufactories in different States, beside agencies and magazines at all distributing points. nov. 1:1y

MANUFACTURERS OF ALL SHAPES OF

FIRE BRICK

FOR IRON WORKS, LIME KILNS, FANNERS,

&c., &c., &c.

Particular attention given to the manufacture of linings for Cupola Furnaces.

Blocks and Tiles for all Purposes.

BRASS FURNACE CIRCULARS.

Stove and Range Linings of every description to order. nov1:1y

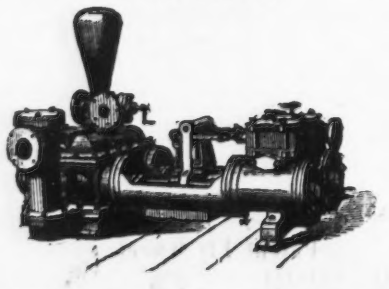
HYDRAULIC WORKS.

MANUFACTORY,

BROOKLYN, N. Y.

Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing; Air and Circulating Pumps, for Marine Engines; Blowing Engines; Vacuum Pumps, Stationary and Portable Steam Fire Engines; Boiler Feed Pumps, Wrecking Pumps,

MINING PUMPS,



Water Meters, Oil Meters; Water Pressure Engines. Steam and Gas Pipe, Valves, Fittings, etc. Iron and Brass Castings.

☞Send for Circular.

feb-11y

H. R. WORTHINGTON,
59 Beekman street, New York

TIN-LINED LEAD PIPE.

TIN-LINED LEAD PIPE is a Block-Tin Pipe heavily coated with solid lead. The metals are so thoroughly united in the process of manufacture as to be, in fact, but one pipe. Tin is a metal closely resembling silver, both in color and purity; hence water flows through tin-lined lead pipe as pure as if drawn through silver. It is as flexible and as easily worked as lead pipe; it is also stronger and more durable.

In addition to the plumbing of houses, it is largely used in conveying water from springs and wells; also for Beer Pumps Water Coolers and Mineral Waters. By its use lead and zinc poisoning and iron rust are all avoided, and general health promoted. Price fifteen cents a pound for all sizes. Circulars and sample of pipe sent by mail free. Address

COLWELLS, SHAW & WILLARD M'f'g. Co.,
No. 213 Centre St., New York.

Also, manufacturers of Block-Tin Pipe, Sheet Lead, Lead Pipe, Solder, &c Orders solicited.

apr25:6mo

CUMBERLAND COAL,

MINED BY THE

CONSOLIDATION COAL COMPANY,

Of the best quality for manufacturing, steam generating, and domestic purposes.

Orders received by the Cargo at

New York Office, 71 Broadway.

New England Agency,

STEVENSON & PEIRSON,
48 Kilby street, Boston.

Baltimore and Georgetown Agency,

G. MEREDITH, South Gay street,
Baltimore.

Mch 7 tf

THE ATTENTION

OF

MANUFACTURERS, DEALERS & IMPORTERS

OF

Iron, Steel, Hardware, Railway Supplies, Lubricating Oils, White Lead, Etc.,

IS INVITED TO THE

Iron World and Manufacturer,

The Largest Metal Price Current in the World.

The leading journals of this Country and Europe recognize it as the Representative Paper of the American Metal Trades.

The publishers have, ever since this journal was established employed the ablest correspondents and solicitors to be procured; expending more money for their salaries alone than the entire expenses of many prominent newspaper establishments. The circulation of the IRON WORLD is far greater than that of any similar publication in this country.

ACCURATE QUOTATIONS AND REPORTS OF THE LEADING HOME AND FOREIGN MARKETS.

THE BEST TALENT IS EMPLOYED, AND IN CONTENTS, PAPER AND TYPOGRAHICAL APPEARANCE, SECOND TO NONE.

Located in the very centre of the metal interests of the United States, with correspondents at the leading cities of the East, West and South, we do not err in claiming that it is the REPRESENTATIVE JOURNAL of the Metal Manufacturers, Workers and Dealers of this country. As a journal for machinists and metal workers it has no rival, and contains every week the choicest selections from engineering, mining and scientific publications of this country and Europe. Its motto is "Progress," and it has compelled other journals, of a similar character, to FOLLOW IN ITS LEAD. Its readers comprise Iron and Steel Manufacturers, Machinists, Founders, Hardware Dealers and Tinners, Gunsmiths, Plumbers, Cutlery Manufacturers, File Manufacturers, Saw Manufacturers, Boiler Manufacturers, and Leading Railway Officials.

ONLY $4 00 PER ANNUM.

If you are in the metal trade, take a metal paper. It will save you more than its cost. If you are a manufacturer take the journal that advocates your interests.

ADVERTISE.

It is universally conceded that advertising is a necessity to success in business. It is also conceded, by the shrewdest business men, that NEWSPAPERS are the best medium for reaching the parties whose trade is desired. The time has been when thousands of dollars were squandered in books, circulars, maps, charts, and other advertising schemes. Now, the largest and shrewdest advertisers, confine themselves to NEWSPAPER ADVERTISING. The IRON WORLD AND MANUFACTURER reaches more people, engaged in the metal trades than the New York *Tribune*. It is, therefore, a

BETTER AND MUCH CHEAPER

Medium of reaching this line of trade than the *Tribune*. We have no hesitation in saying that our journal is the BEST medium in the United States for reaching the metal trade; and we will be happy at any time to furnish references to leading manufacturers in this city and elsewhere, who will testify to the fact that they have received orders for goods from parties who read their cards in the IRON WORLD. In fact, many who have availed themselves of this medium, candidly say that its value exceeds that of all other journals in which they are represented.

NOTICES OF THE PRESS.

[From the U. S. *Railroad and Mining Register*, Philadelphia.]

THE IRON WORLD AND MANUFACTURER, of Pittsburgh, comes to us as usual, full of excellent reading and indispensable trade statistics, reports of markets, new inventions, and advertisements, well illustrated, and capitally well printed. The columns on its second page present a weekly picture of the condition and prospects of the iron manufacture west of the Allegheny mountains, and of the metal trade of the seaboard cities. This paper shows how to do one thing, and do it well. It does not fritter away its energies on collateral subjects, repeating what has been said by the daily press; and it succeeds therefore in its first design of supplying workers and dealers in iron with all the current news relating to that business. It is in this respect the iron organ of the country, and deserves the liberal patronage its advertising columns represent. Its editorials are fresh, intelligent and free from prejudice, and its correspondents tell us the things best worth knowing about the iron establishments of the country.

SAMPLE COPIES MAILED FREE.

ADDRESS,

IRON WORLD PUBLISHING CO.,

No. 71 GRANT STREET, PITTSBURGH, Pa.,